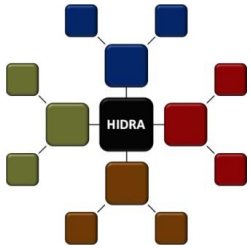


Hutch Integrated Data Repository and Archive (HIDRA)

Paul A. Fearn, MBA
Director, Biomedical Informatics
Fred Hutch Cancer Research Center

October 23, 2014

UW Medicine
Seattle Cancer Care Alliance
Fred Hutchinson Cancer Research Center
A Life of Science
Seattle Children's
Hospital • Research • Foundation
ITHS
Institute of Translational Health Sciences
LabKey Software
Partners in Science

HIDRA

- **Vision and Strategy**
- Systems & Requirements
- Program Overview
- Argos user interface
- Next steps

Hutch Integrated Data Repository & Archive (HIDRA)

Strategic Drivers

Larry Corey, MD
Director FHCRC

Catalyzing our efforts to build strength in clinical molecular diagnostics and precision oncology

- FHCRC "Center News", 4/1/13

Contribute to building a strong Fred Hutchinson / University of Washington Cancer Consortium [translational research] program

- Center Strategic Plan 2010-2015

Strengthening the Consortium's clinical research programs and infrastructure to permit more rapid development of diagnostics and therapeutics

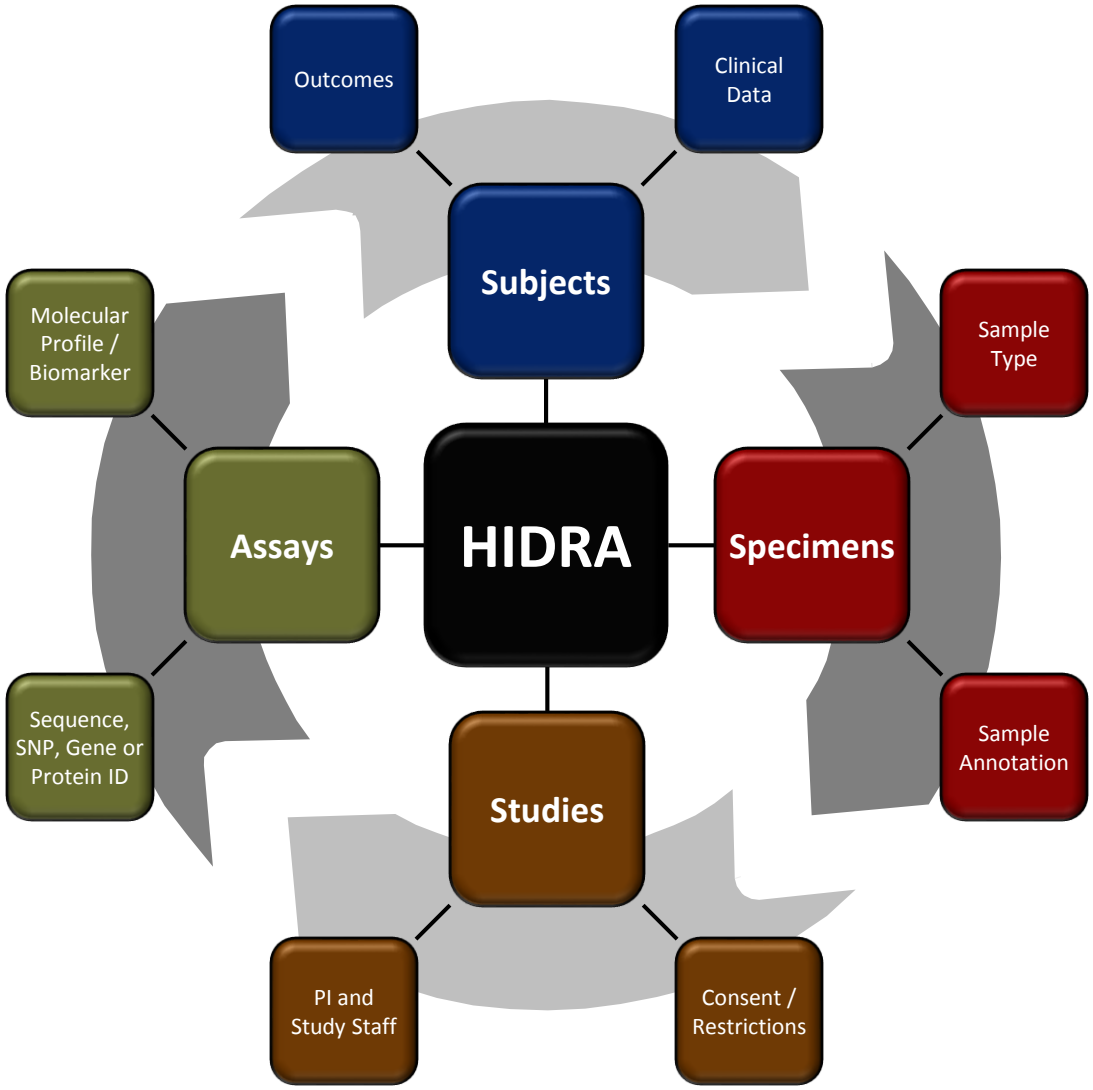
- Senior Leadership, Cancer Consortium, RE: areas that require continuing resource commitment

Need an integrated database approach and a Consortium-wide informatics platform strategy

- CCSG Reviewers, 2008

Vision for HIDRA Data Integration Scope & Axes

Master Indexes of Consortium Patients, Specimens, Studies and Assays



HIDRA Goals

Rapid-Learning Informatics Platform for Competitive NCI CCC

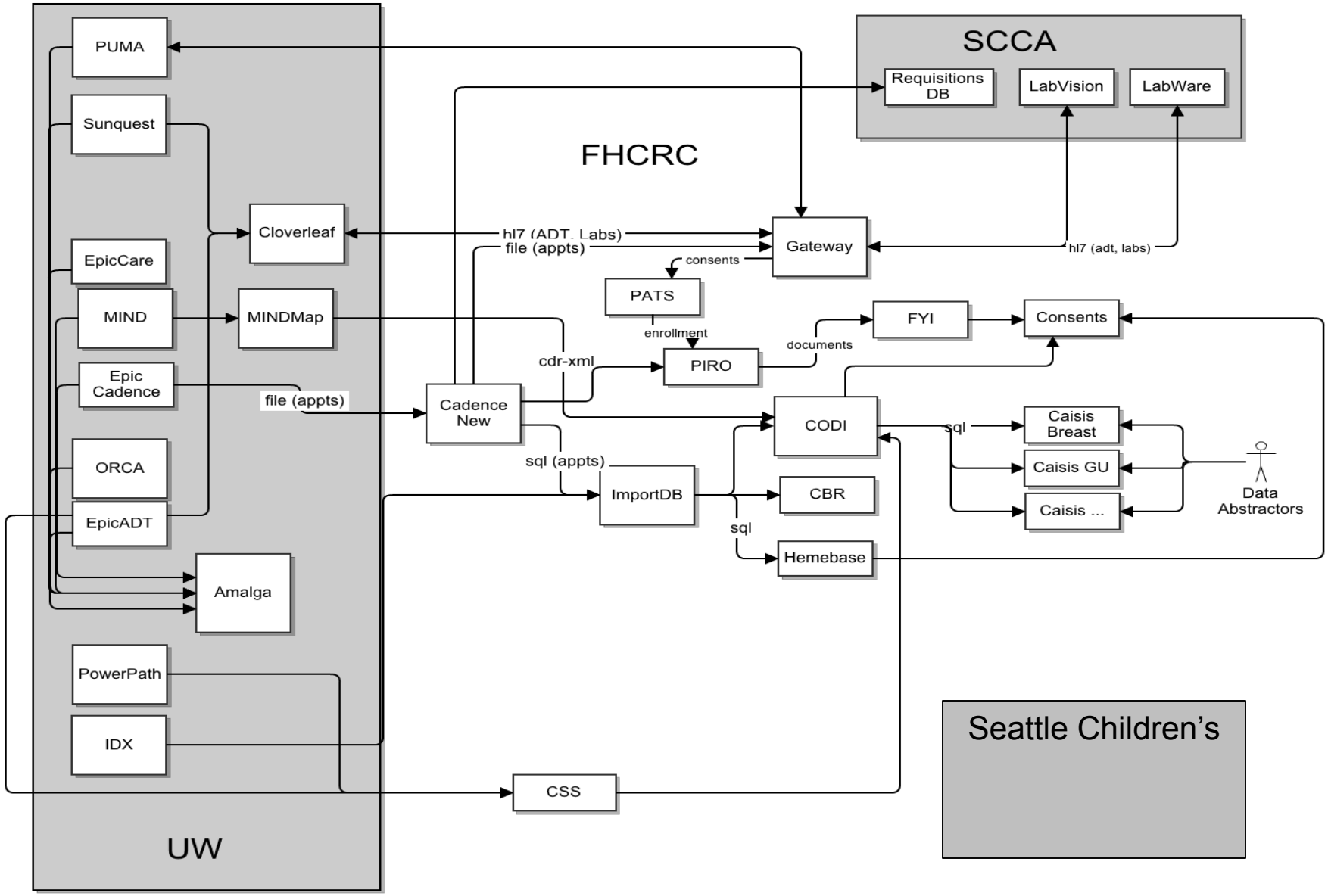
- **Enable us to learn from every patient who comes through the door, and integrate that knowledge back into the clinical care**
  - Use of clinical data for research, activities preparatory to research, healthcare operations, QI/QA, and public health reporting purposes
- **Integrate**
  - Integrate data and systems across all disease groups
  - Link specimen, genomic and other assay data with clinical data
  - Integrate security/permissions with Consortium CTMS
- **Automate or facilitate manual, repetitive work**
  - Manual data abstraction, feeds and NLP from medical records
  - Outcomes data (e.g. CSS, long-term follow-up and patient reported)
- **Strong competitive platform**
  - Be ready for FISMA security or FDA regulatory reviews or audits

HIDRA

- Vision and Strategy
- **Systems & Requirements**
- Program Overview
- Argos user interface
- Next steps

Pre-HIDRA Informatics Ecosystem at Fred Hutch

Consortium Data Flows *before HIDRA Core*



NLP Requirements Analysis

We condensed over 14,000 existing and desired fields from 13 different disease groups into just under 4,000 individual elements

- 65% of data elements come from unstructured sources

  (this estimate was made assuming that patients are diagnosed and receive all of their treatment within the consortium)

- 15% of data elements could be patient reported

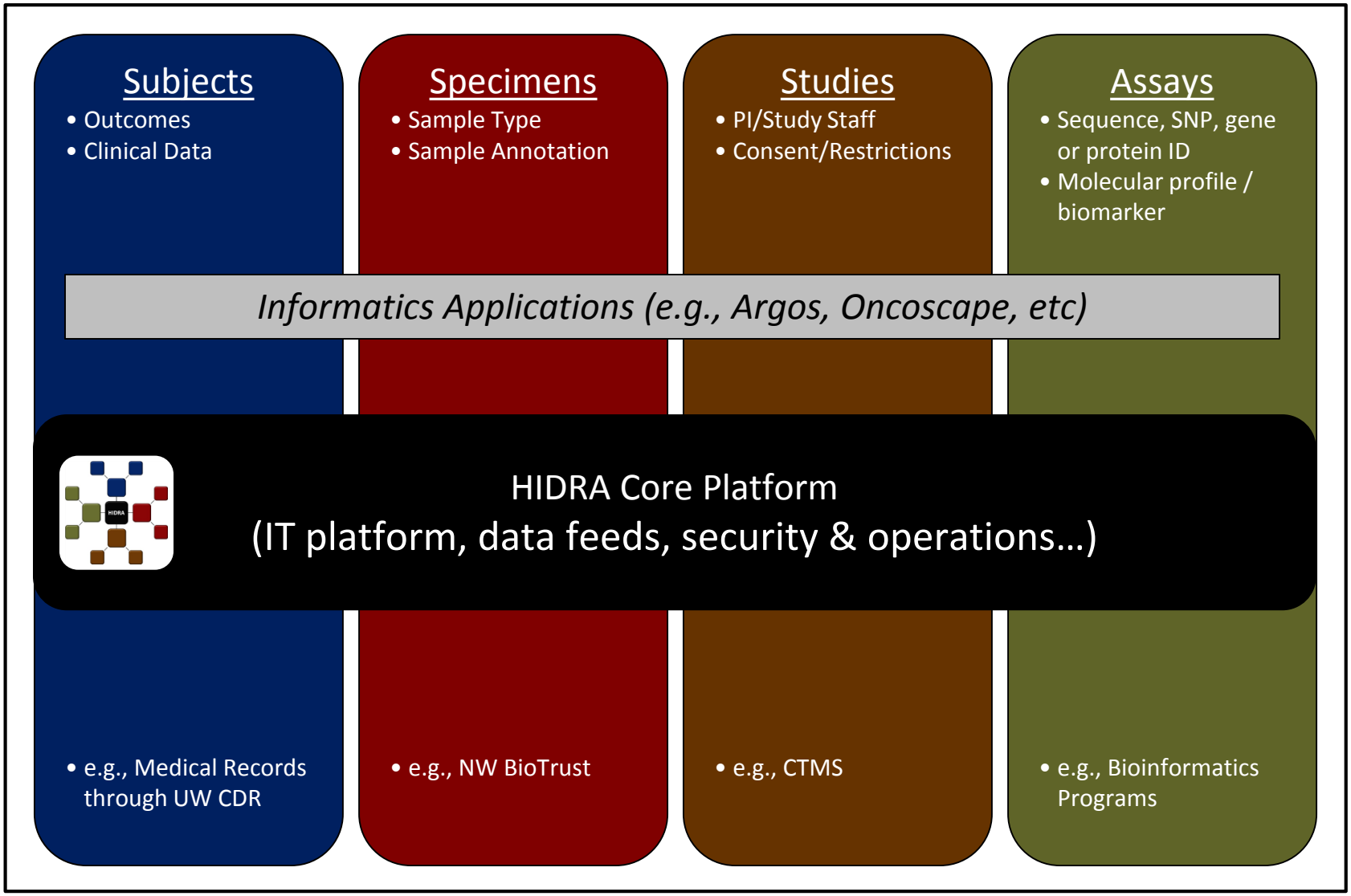
  (about 75% of these elements are currently coming from unstructured sources)

- 15% of data elements are computed from other elements

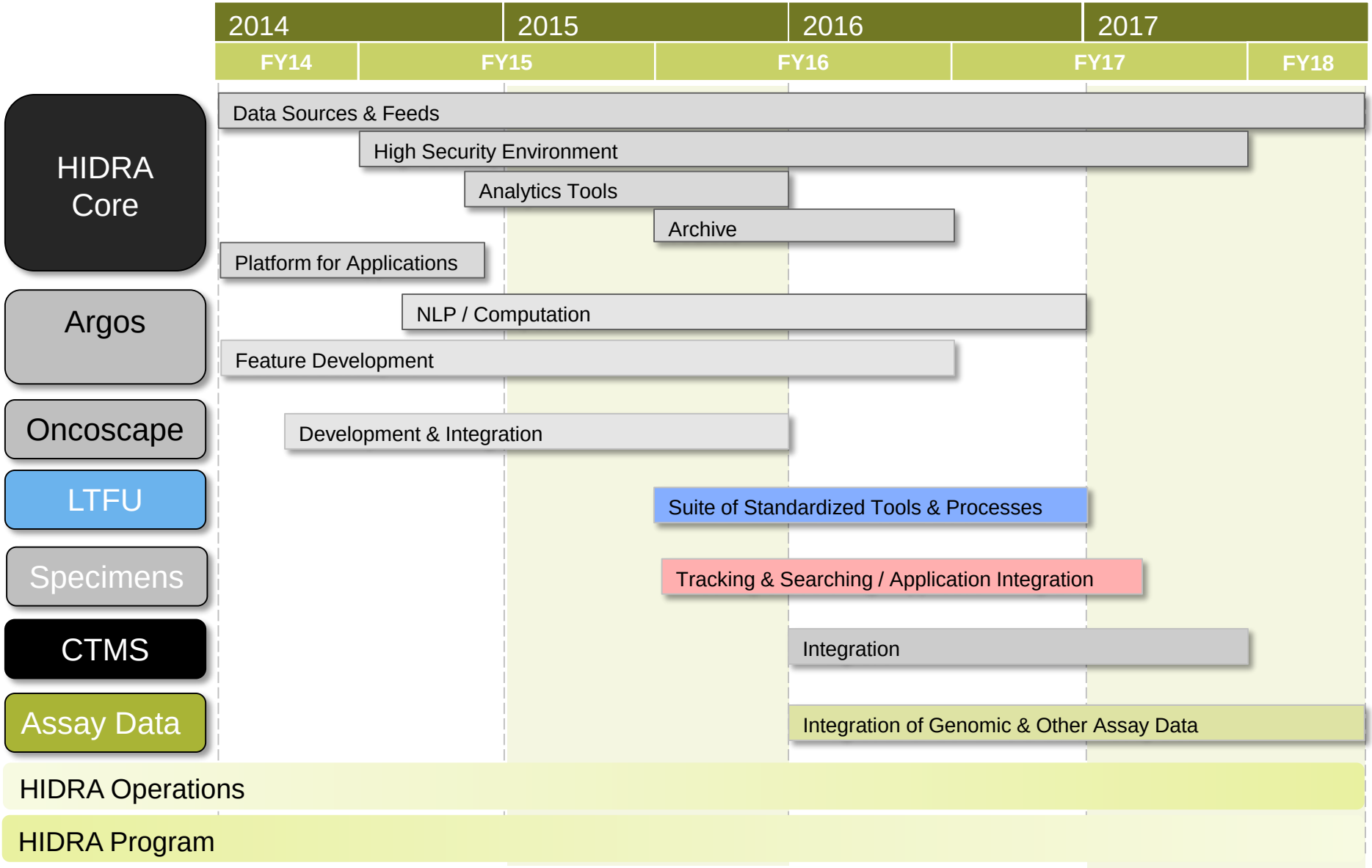
HIDRA

- Vision and Strategy
- Systems & Requirements
- **Program Overview**
- Argos user interface
- Next steps

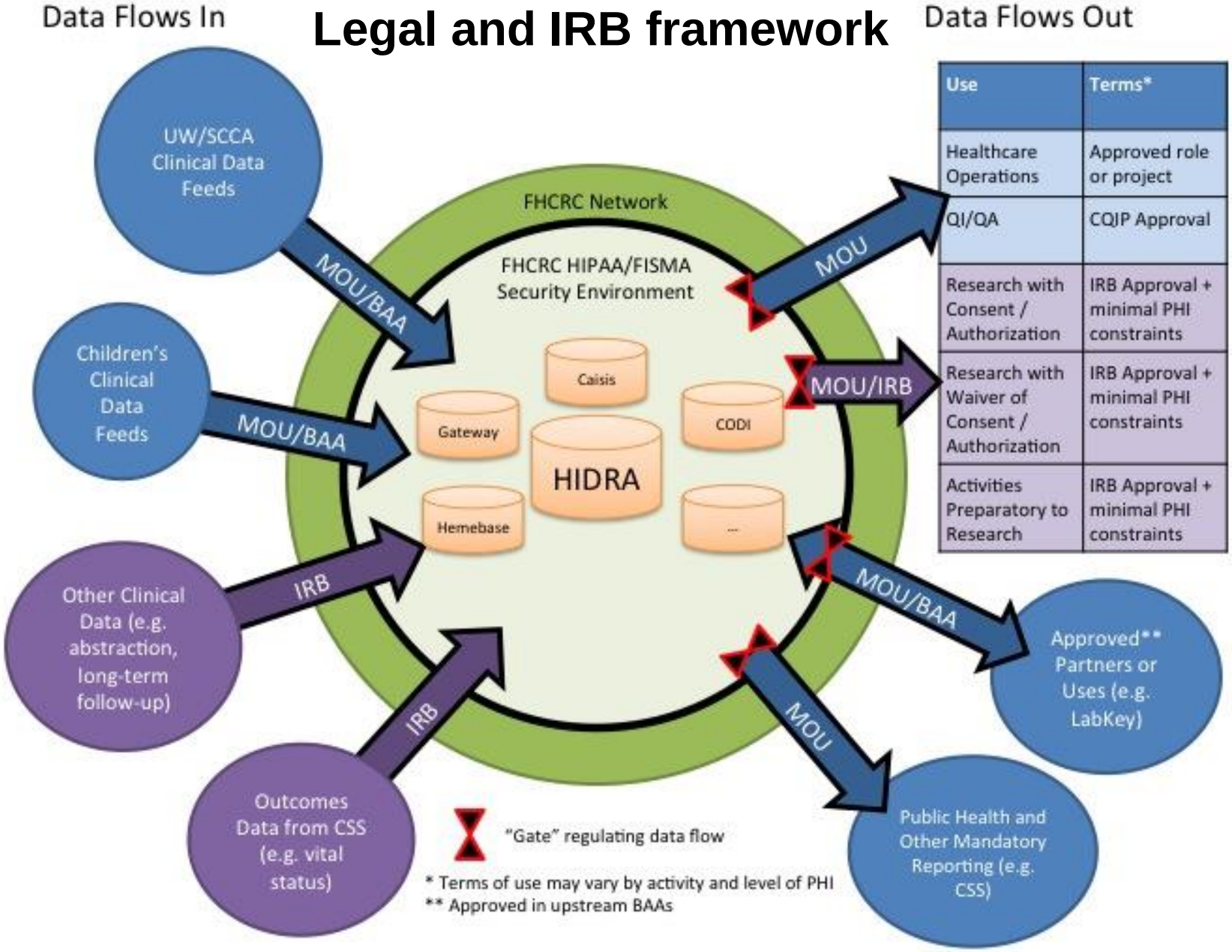
HIDRA Program: Platform and Applications Framework



HIDRA Program Road Map



Legal and IRB framework

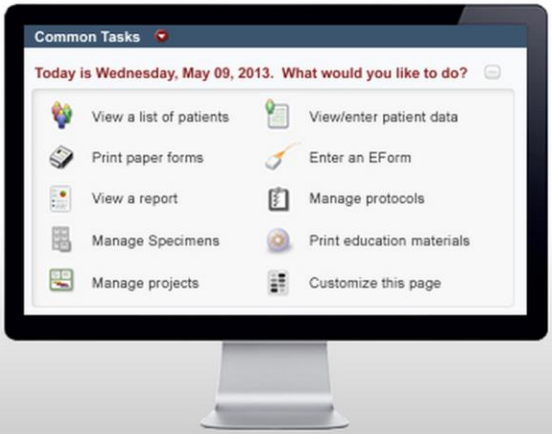


Use	Terms*
Healthcare Operations	Approved role or project
QI/QA	CQIP Approval
Research with Consent / Authorization	IRB Approval + minimal PHI constraints
Research with Waiver of Consent / Authorization	IRB Approval + minimal PHI constraints
Activities Preparatory to Research	IRB Approval + minimal PHI constraints

Past Work – Caisis @ MSKCC 1998 - present

CAISIS

Features Collaboration Documentation Download Support



A Better Way to Manage Cancer Data

Caisis is the most widely used free and open-source oncology resea

Learn More Try Demo ›

Date	Variable	Value	Quality
	Family Hx	2 Father Bone Cancer	
10-02-2011	Procedures	Adrenalectomy	REV
10-03-2011	LetterReturnedToSender	Pending	
	Letter2_Sent	Complete	
	Abdominal Pain	333	OUT
	Consent	Prostate	
10-04-2011	Ferrous Sulfate		OUT
	Abdominal Wall Tumor Excision	Laparotomy Bilateral	STD
10-10-2011	Prot 567890	Considering	OUT
	Procedures	Abdomino Perineal Resection	OUT
10-11-2011	Dietary Intake		REV
	Medical Emergency	Orthopedics	23
	Alive	Appendiceal Cancer	REV
	Sexual Function	23/45	REV
10-12-2011	DataEntered	Pending	
	CVA		
10-18-2011	ACP	6:85	OUT
10-25-2011	UICC_02	TXN0MX Ampulla	OUT

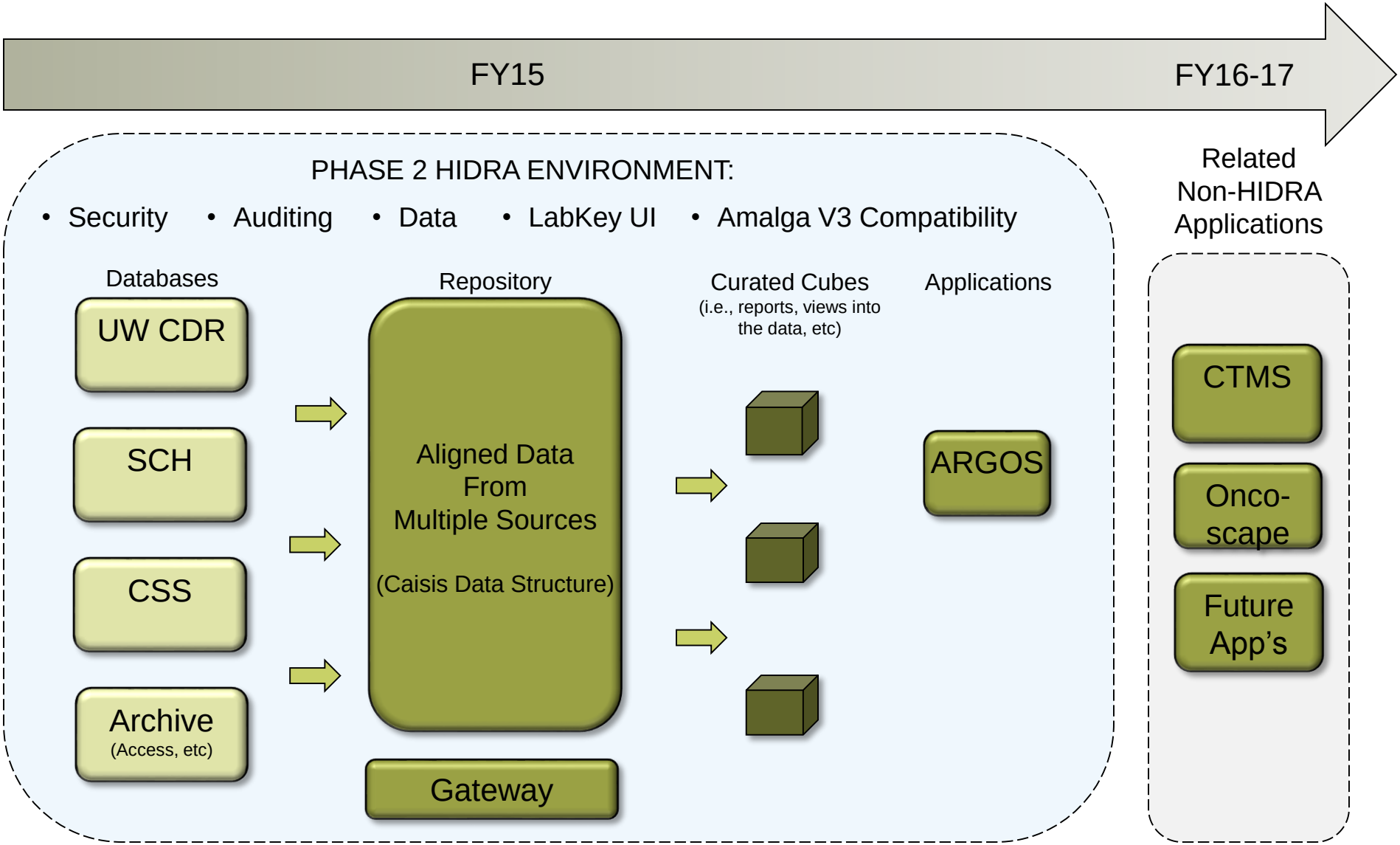
What is Caisis?

Caisis is an open source, web-based cancer data management system that integrates research with patient care. The sys
promote standards and collaborative research, and has been downloaded by thousands of institutions world wide.

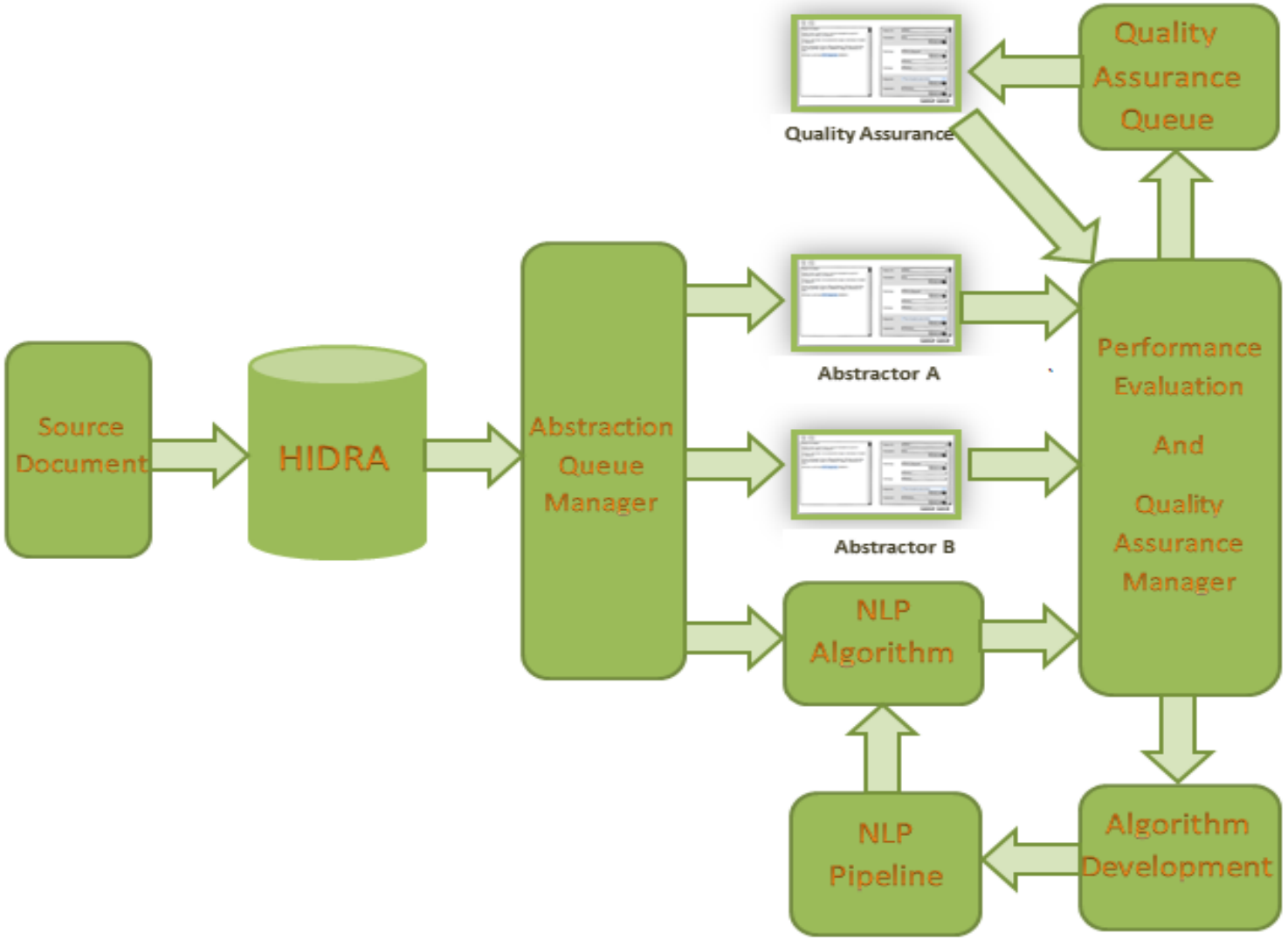
For over a decade, collaboration with multiple centers has allowed Caisis to develop and evolve in an environment of cons
community has shaped the features, usability, and overall vision of creating large, clean, unbiased datasets that will impro
care.

caisis.org

HIDRA Environment: Conceptual Diagram



Natural Language Processing Pipeline



mammogram was obtained dated 01/28/12, which showed a mass in the right breast. On 02/10/12, she underwent an ultrasound-guided biopsy. The pathology showed an infiltrating ductal carcinoma Nottingham grade II. The tumor was ER positive, PR positive and HER-2/neu negative. On 02/22/12, she underwent a lumpectomy and sentinel lymph node biopsy. The pathology showed a 3.3 cm infiltrating ductal carcinoma grade I, one sentinel lymph node was negative. Therefore it was a T2, N0, M0 stage IIA breast cancer. Of note, at that time she was taking hormone replacement therapy and that was stopped. She underwent radiation treatment ending in May 2008. She then started on Arimidex, but unfortunately she did not tolerate the Arimidex and I changed her to Femara. She also did not tolerate the Femara and I changed it to tamoxifen. She did not tolerate the tamoxifen and therefore when I saw her on 11/23/12, she decided that she would take no further antiestrogen therapy. She met with me again on 02/22/13, and decided she wants to rechallenge herself with tamoxifen. When I saw her on 04/28/13, she was really doing quite well with tamoxifen. She tells me 2 weeks after that visit, she developed toxicity from the tamoxifen and therefore stopped it herself. She is not going take to any further tamoxifen.

Overall, she is feeling well. She has a good energy level and her ECOG performance status is 0. She denies any fevers, chills, or night sweats. No lymphadenopathy. No nausea or vomiting. No change in bowel or bladder habits.

CURRENT MEDICATIONS: Avapro 300 mg q.d., Pepcid q.d., Zyrtec p.r.n., and calcium q.d.
ALLERGIES: Sulfa, Betadine, and IV contrast.

PROCEDURE:	Mammogram
	01/28/12
MAMMOGRAM:	Mass on right side
PROCEDURE:	Ultrasound-guided biopsy
	02/10/12
TUMOR:	Invasive ductal carcinoma
Endocrine:	ER positive, PR negative
HER2:	HER2/neu negative
Nottingham:	Grade 2
Procedure:	Lumpectomy
	02/22/12
Staging:	T2
Tumor size:	3.3cm
Lymph:	N0

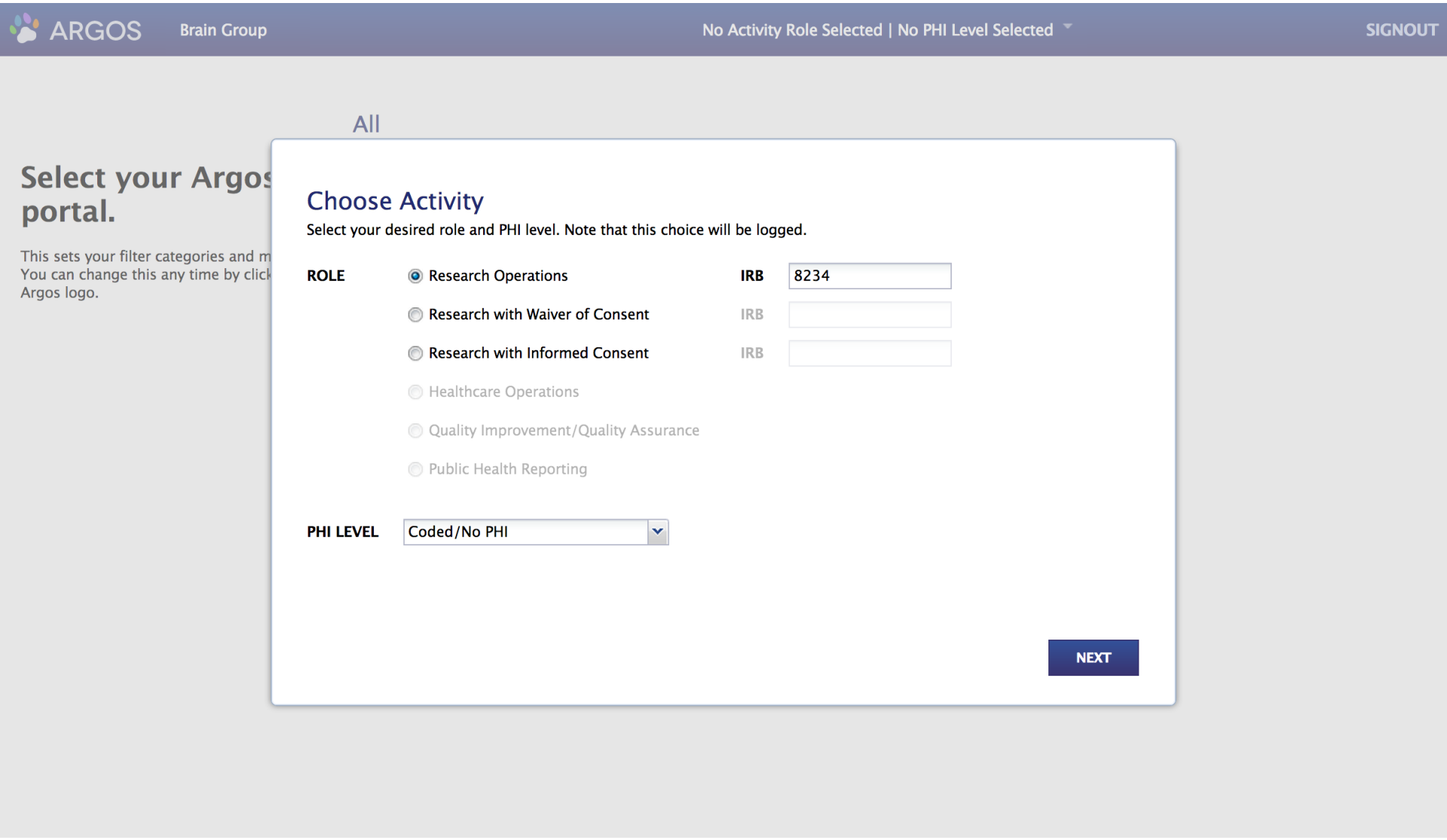
CANCEL VERIFY

HIDRA

- Vision and Strategy
- Systems & Requirements
- Program Overview
- **Argos user interface**
- Next steps


ARGOS
A project of Fred Hutch labs
pfearn
SIGN IN
Forgot Password?


ARGOS
No Activity Role Selected | No PHI Level Selected
SIGNOUT
Select your Argos portal.
This sets your filter categories and more. You can change this any time by clicking the Argos logo.
All
All Patients
Since: Feb. 10, 2014
By Disease Group
Brain
Since: Feb. 10, 2014
By Study
IRB 8234
Since: Feb. 10, 2014


ARGOS
Brain Group
No Activity Role Selected | No PHI Level Selected
SIGNOUT
All
Select your Argos
portal.
This sets your filter categories and m
You can change this any time by click
Argos logo.
Choose Activity
Select your desired role and PHI level. Note that this choice will be logged.
ROLE
Research Operations
IRB
8234
Research with Waiver of Consent
IRB
Research with Informed Consent
IRB
Healthcare Operations
Quality Improvement/Quality Assurance
Public Health Reporting
PHI LEVEL
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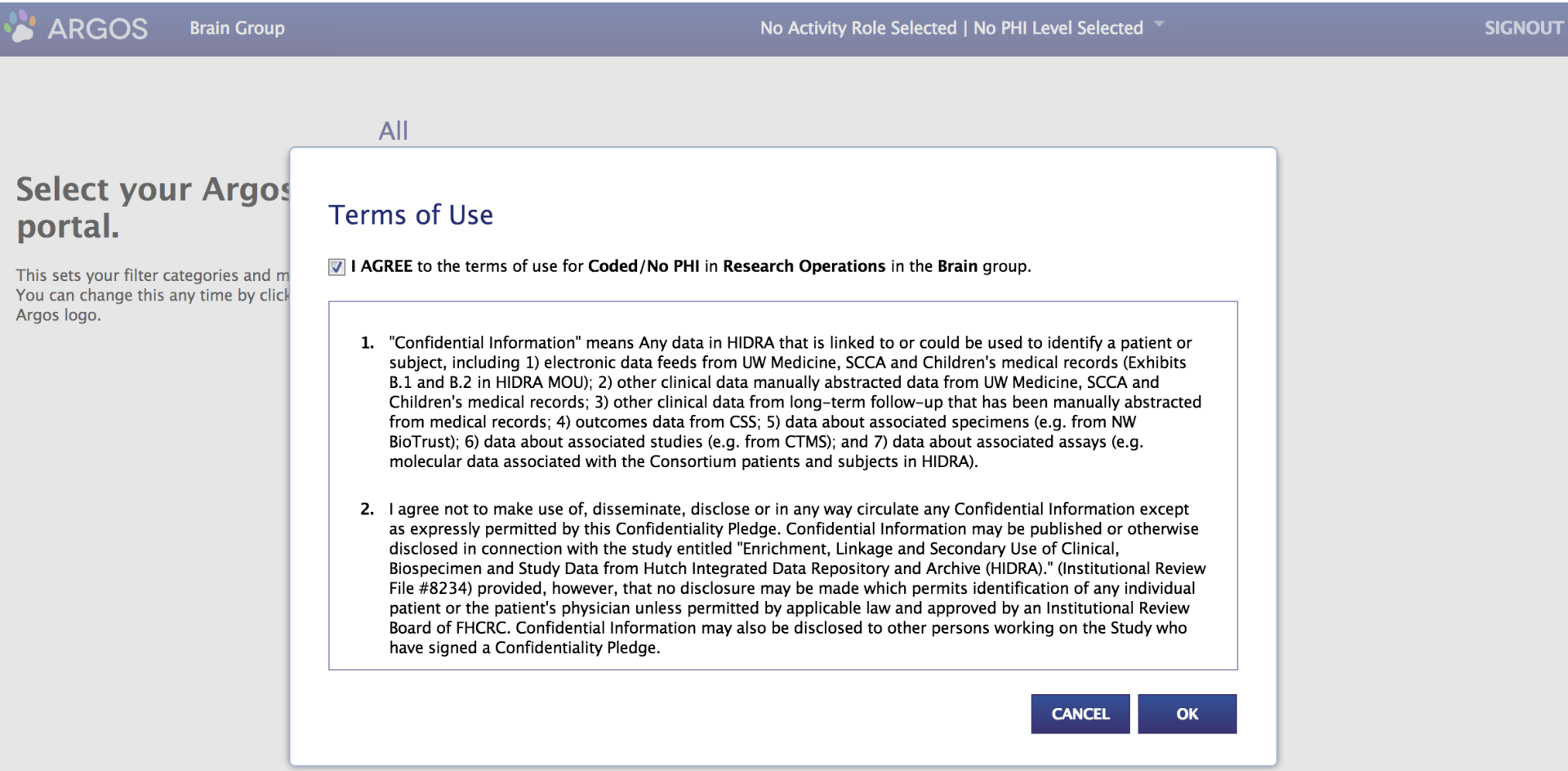
NEXT


ARGOS
Brain Group
No Activity Role Selected | No PHI Level Selected
SIGNOUT
All
Select your Argos
portal.
This sets your filter categories and m
You can change this any time by click
Argos logo.
Terms of Use
I AGREE to the terms of use for Coded/No PHI in Research Operations in the Brain group.
1. "Confidential Information" means Any data in HIDRA that is linked to or could be used to identify a patient or subject, including 1) electronic data feeds from UW Medicine, SCCA and Children's medical records (Exhibits B.1 and B.2 in HIDRA MOU); 2) other clinical data manually abstracted data from UW Medicine, SCCA and Children's medical records; 3) other clinical data from long-term follow-up that has been manually abstracted from medical records; 4) outcomes data from CSS; 5) data about associated specimens (e.g. from NW BioTrust); 6) data about associated studies (e.g. from CTMS); and 7) data about associated assays (e.g. molecular data associated with the Consortium patients and subjects in HIDRA).
2. I agree not to make use of, disseminate, disclose or in any way circulate any Confidential Information except as expressly permitted by this Confidentiality Pledge. Confidential Information may be published or otherwise disclosed in connection with the study entitled "Enrichment, Linkage and Secondary Use of Clinical, Biospecimen and Study Data from Hutch Integrated Data Repository and Archive (HIDRA)." (Institutional Review File #8234) provided, however, that no disclosure may be made which permits identification of any individual patient or the patient's physician unless permitted by applicable law and approved by an Institutional Review Board of FHCRC. Confidential Information may also be disclosed to other persons working on the Study who have signed a Confidentiality Pledge.
CANCEL
OK

Overall Patient Statistics

	This Month	This Year	Total
Embryonal Tumors	**0**	**0**	**9**
Ependymal Tumors	**0**	**0**	**16**
Gliomas	**0**	**22**	**487**
Medical Therapy	0	16	314
Procedures	0	8	487
Radiation Therapy	0	4	367
Meningothelial Tumors	**0**	**4**	**149**
Metastatic Tumors	**0**	**0**	**1**
Nerve Sheath Tumors	**0**	**1**	**148**
Other	**0**	**0**	**40**
Other Brain Tumors	**0**	**0**	**19**
Other Neuroepithelial Tumors	**0**	**0**	**15**
Sellar Tumors	**0**	**0**	**6**

My Links

Saved Filter: MyFilter
Saved Filter: study
Saved Filter: new filter!
Saved Filter: DemoMonday
Saved Filter: Alex spence filter
Saved Filter: Donald Born Pathology records

1,735 Patients
2,788 Specimens
26 Studies

ACTIVE FILTERS

In Saved Group

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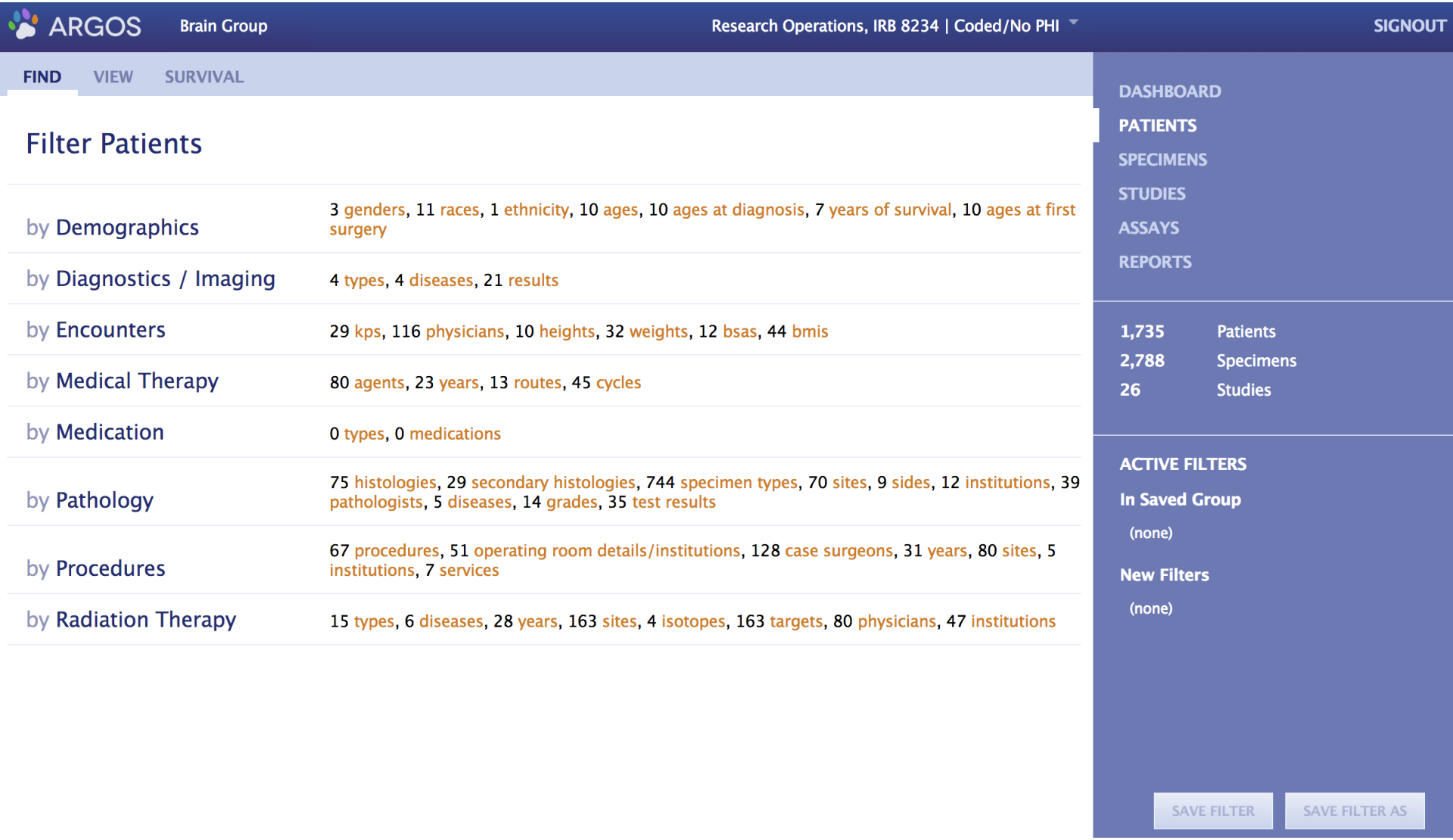
New Filters

(none)

SAVE FILTER SAVE FILTER AS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Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
Filter Patients
by Demographics
3 genders, 11 races, 1 ethnicity, 10 ages, 10 ages at diagnosis, 7 years of survival, 10 ages at first surgery
by Diagnostics / Imaging
4 types, 4 diseases, 21 results
by Encounters
29 kps, 116 physicians, 10 heights, 32 weights, 12 bsas, 44 bmis
by Medical Therapy
80 agents, 23 years, 13 routes, 45 cycles
by Medication
0 types, 0 medications
by Pathology
75 histologies, 29 secondary histologies, 744 specimen types, 70 sites, 9 sides, 12 institutions, 39 pathologists, 5 diseases, 14 grades, 35 test results
by Procedures
67 procedures, 51 operating room details/institutions, 128 case surgeons, 31 years, 80 sites, 5 institutions, 7 services
by Radiation Therapy
15 types, 6 diseases, 28 years, 163 sites, 4 isotopes, 163 targets, 80 physicians, 47 institutions
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
1,735 Patients
2,788 Specimens
26 Studies
ACTIVE FILTERS
In Saved Group
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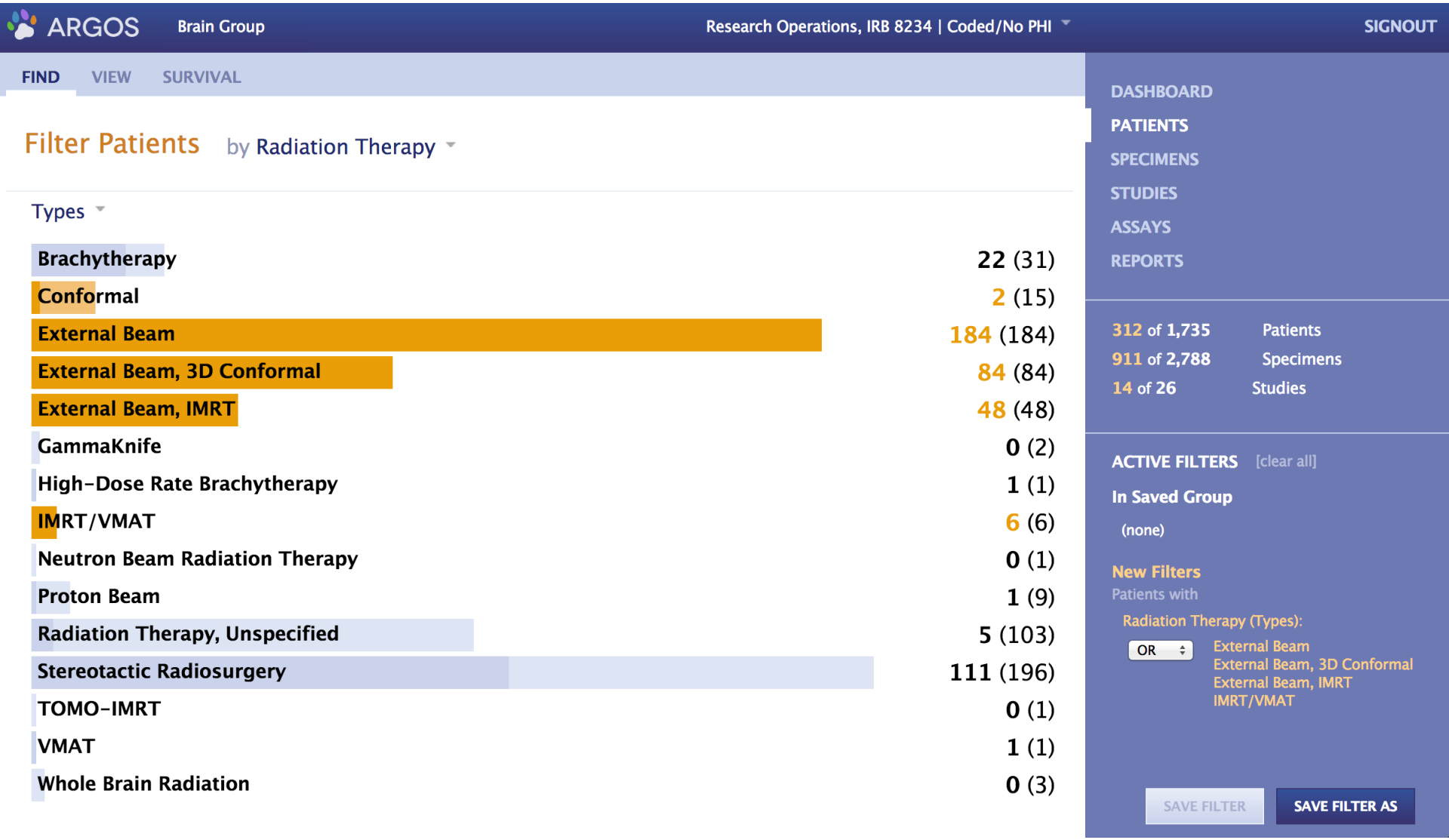
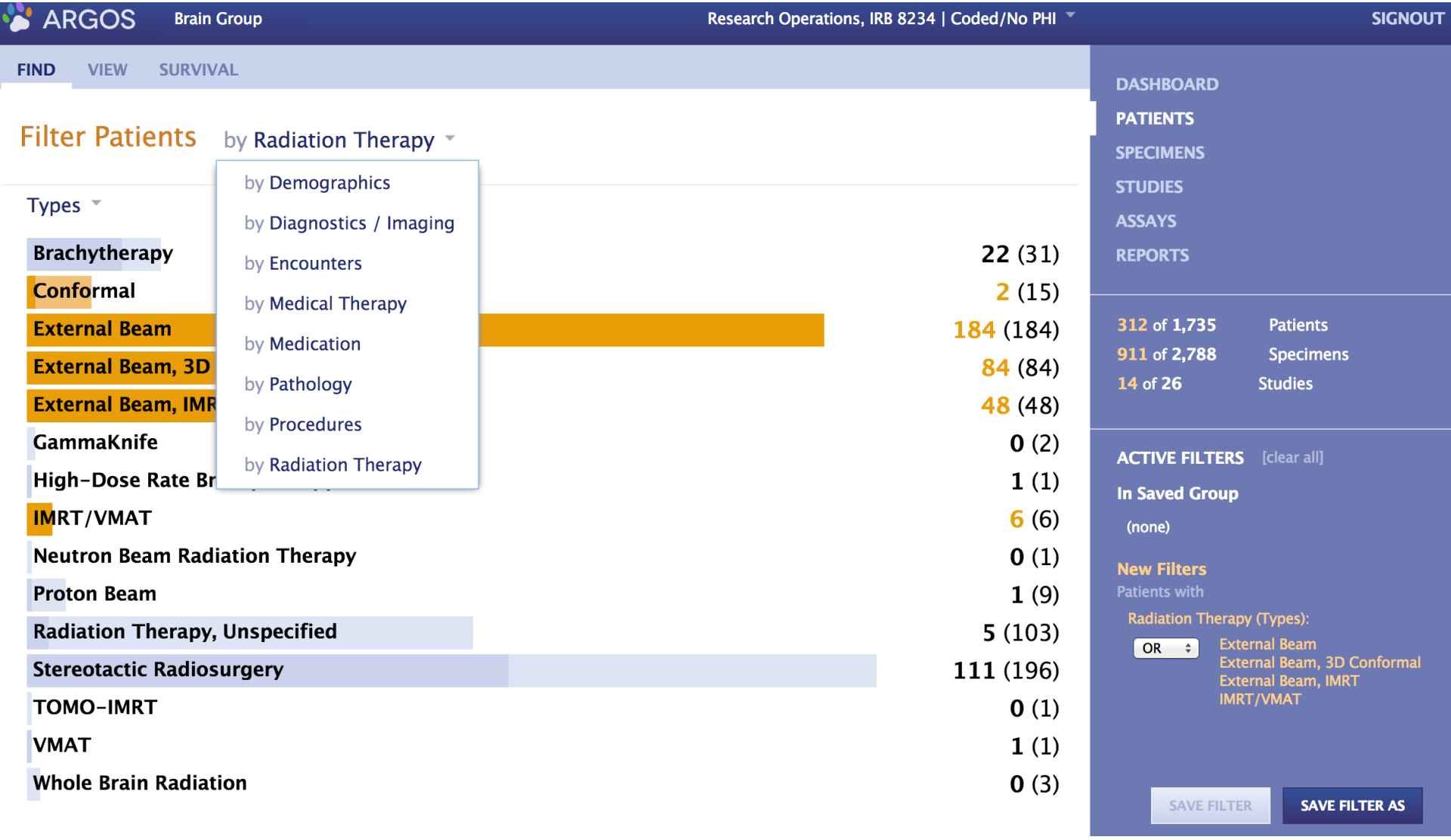
New Filters
(none)
SAVE FILTER
SAVE FILTER AS


ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
Filter Patients
by Radiation Therapy
Types
Brachytherapy 22 (31)
Conformal 2 (15)
External Beam 184 (184)
External Beam, 3D Conformal 84 (84)
External Beam, IMRT 48 (48)
GammaKnife 0 (2)
High-Dose Rate Brachytherapy 1 (1)
IMRT/VMAT 6 (6)
Neutron Beam Radiation Therapy 0 (1)
Proton Beam 1 (9)
Radiation Therapy, Unspecified 5 (103)
Stereotactic Radiosurgery 111 (196)
TOMO-IMRT 0 (1)
VMAT 1 (1)
Whole Brain Radiation 0 (3)
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
312 of 1,735 Patients
911 of 2,788 Specimens
14 of 26 Studies
ACTIVE FILTERS [clear all]
In Saved Group
(none)
New Filters
Patients with
Radiation Therapy (Types):
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
SAVE FILTER
SAVE FILTER AS


ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
Filter Patients
by Radiation Therapy
by Demographics
by Diagnostics / Imaging
by Encounters
by Medical Therapy
by Medication
by Pathology
by Procedures
by Radiation Therapy
Types
Brachytherapy 22 (31)
Conformal 2 (15)
External Beam 184 (184)
External Beam, 3D 84 (84)
External Beam, IMR 48 (48)
GammaKnife 0 (2)
High-Dose Rate Br 1 (1)
IMRT/VMAT 6 (6)
Neutron Beam Radiation Therapy 0 (1)
Proton Beam 1 (9)
Radiation Therapy, Unspecified 5 (103)
Stereotactic Radiosurgery 111 (196)
TOMO-IMRT 0 (1)
VMAT 1 (1)
Whole Brain Radiation 0 (3)
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
312 of 1,735 Patients
911 of 2,788 Specimens
14 of 26 Studies
ACTIVE FILTERS [clear all]
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New Filters
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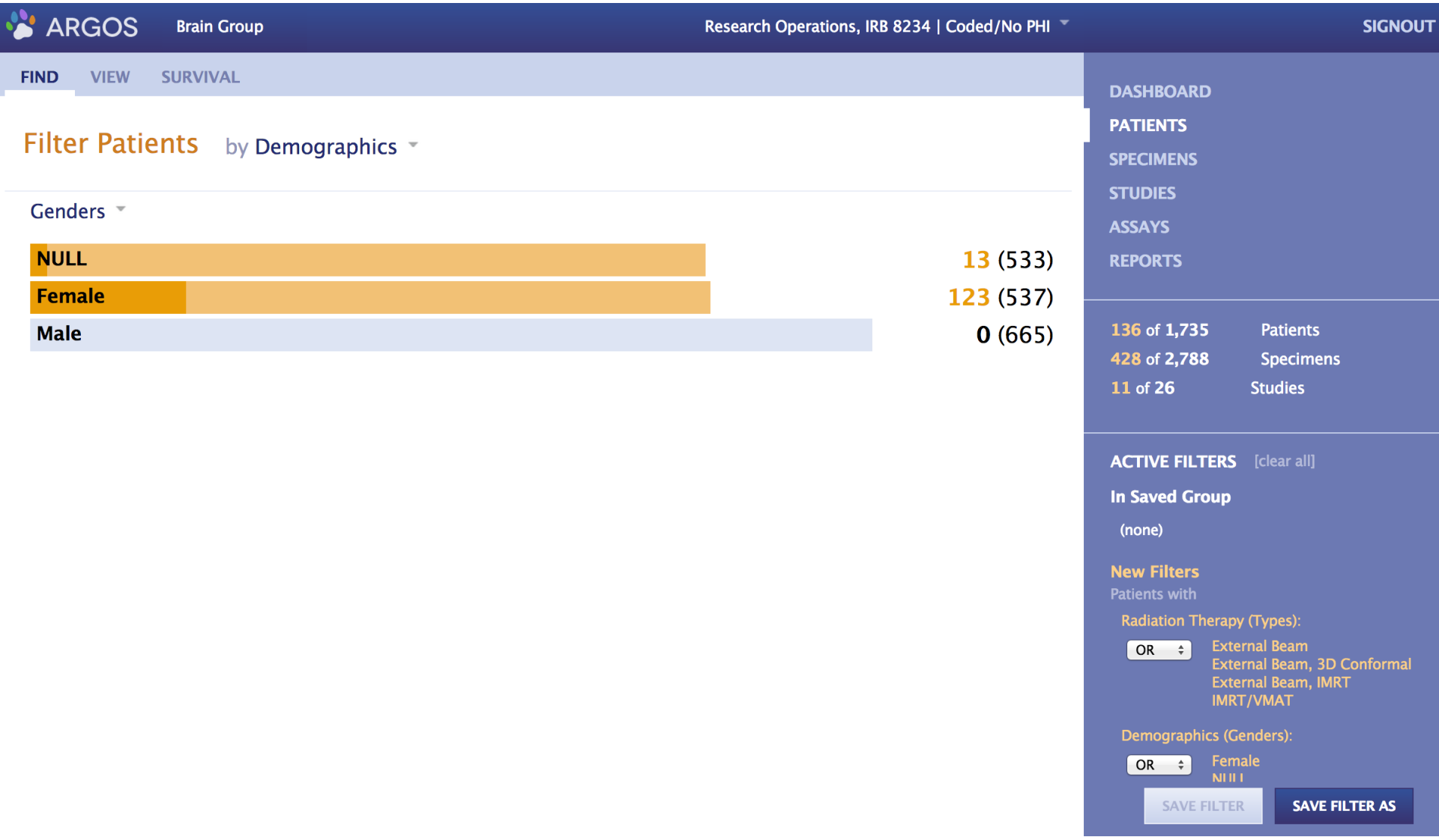
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
SAVE FILTER
SAVE FILTER AS

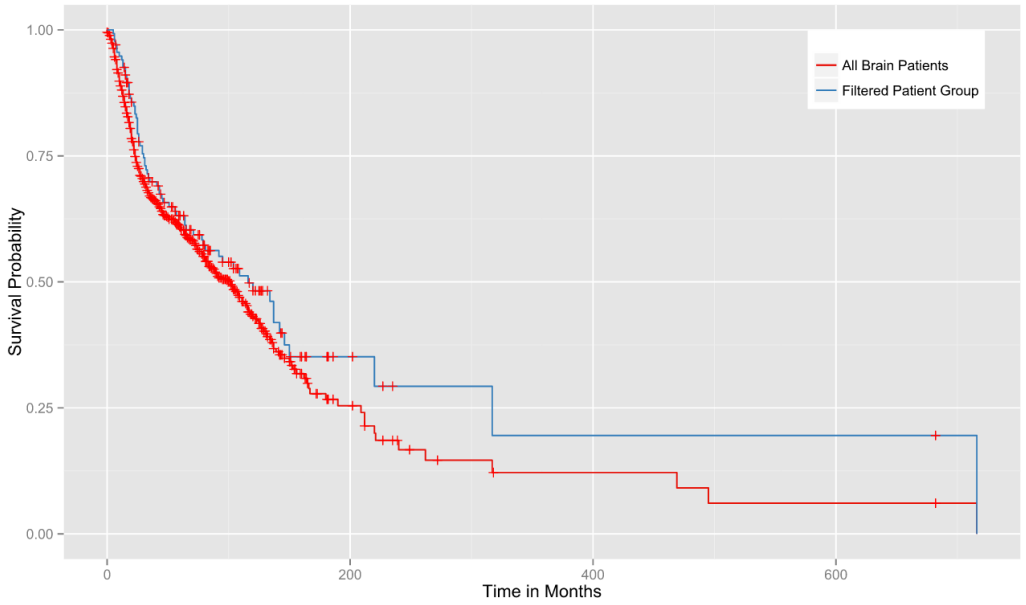

ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
Filter Patients
by Demographics
Genders
NULL
13 (533)
Female
123 (537)
Male
0 (665)
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
136 of 1,735 Patients
428 of 2,788 Specimens
11 of 26 Studies
ACTIVE FILTERS [clear all]
In Saved Group
(none)
New Filters
Patients with
Radiation Therapy (Types):
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
Demographics (Genders):
OR
Female
SAVE FILTER
SAVE FILTER AS

ARGOS Brain Group | Research Operations, IRB 8234 | Coded/No PHI | SIGNOUT

FIND VIEW SURVIVAL

Survival Curves

EXPORT



- [ ] All
- [x] General
  - [x] All Brain Patients
  - [x] Filtered Patient Group
- [ ] Histology
  - [ ] Embryonal Tumors
  - [ ] Ependymal Tumors
  - [ ] Gliomas
  - [ ] Meningothelial Tumors
  - [ ] Metastatic Tumors
  - [ ] Nerve Sheath Tumors
  - [ ] Other
  - [ ] Other Brain Tumors
  - [ ] Other Neuroepithelial Tum
  - [ ] Sellar Tumors

DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS

136 of 1,735 Patients
428 of 2,788 Specimens
11 of 26 Studies

ACTIVE FILTERS [clear all]

In Saved Group

(none)

New Filters

Patients with

Radiation Therapy (Types):

OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT

Demographics (Genders):

OR Female

SAVE FILTER SAVE FILTER AS

ARGOS Brain Group

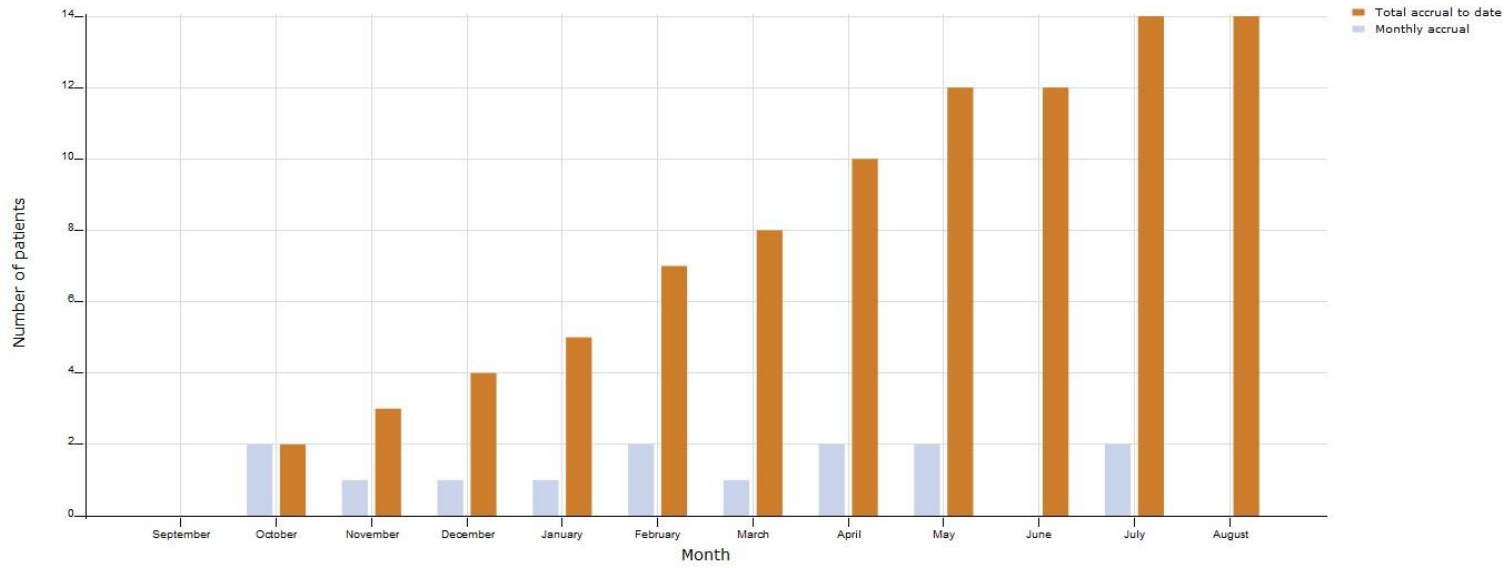
Research Operations, IRB 8234 | Coded/No PHI

FIND VIEW SURVIVAL ACCRUAL ONCOSCAPE

DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS

Patient Accrual (End Date 2012-09-15)

EXPORT



112 of 729 Patients
225 of 1,001 Specimens
5 of 68 Studies

ACTIVE FILTERS [clear all]

In Saved Group

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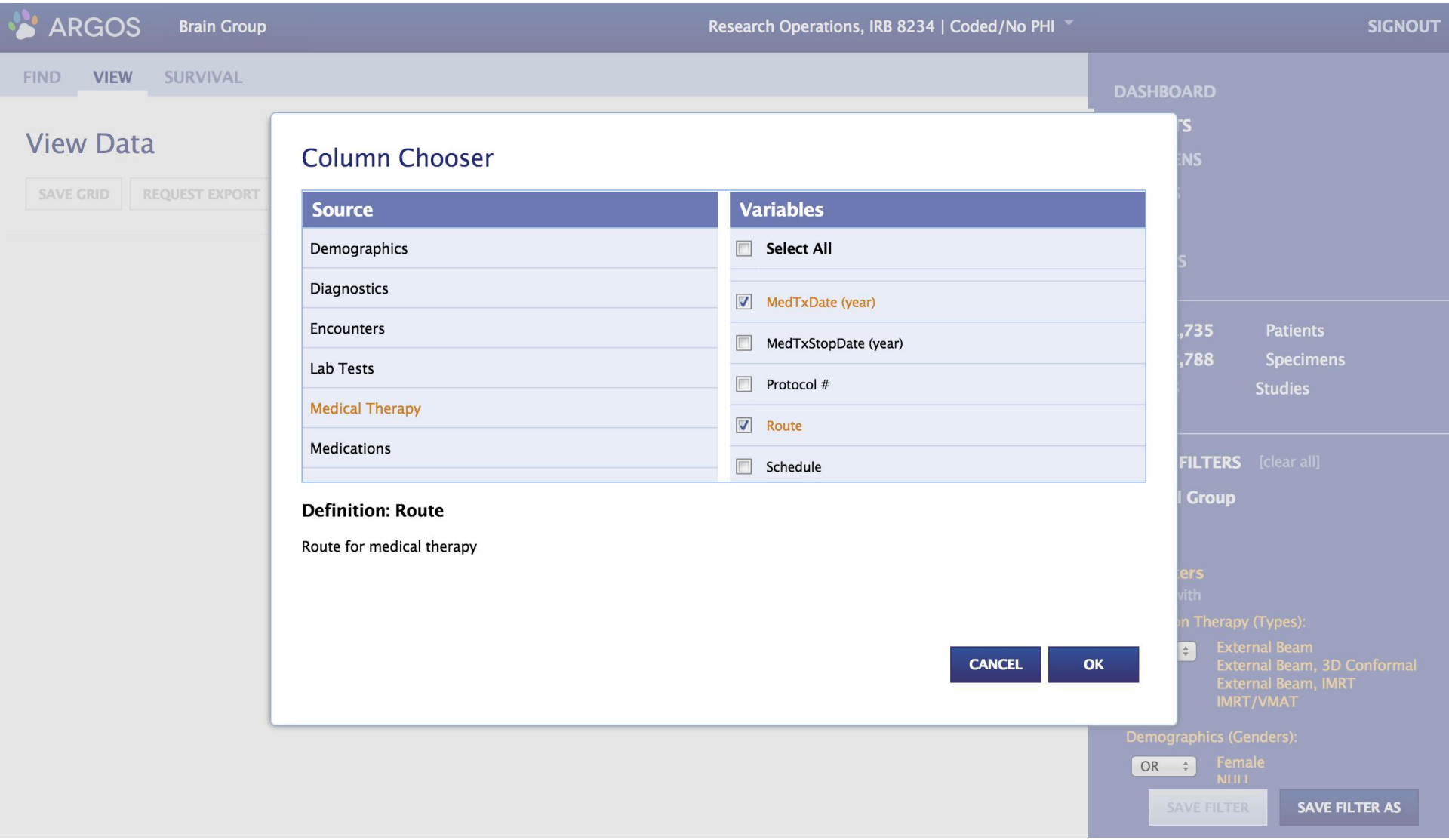
New Filters

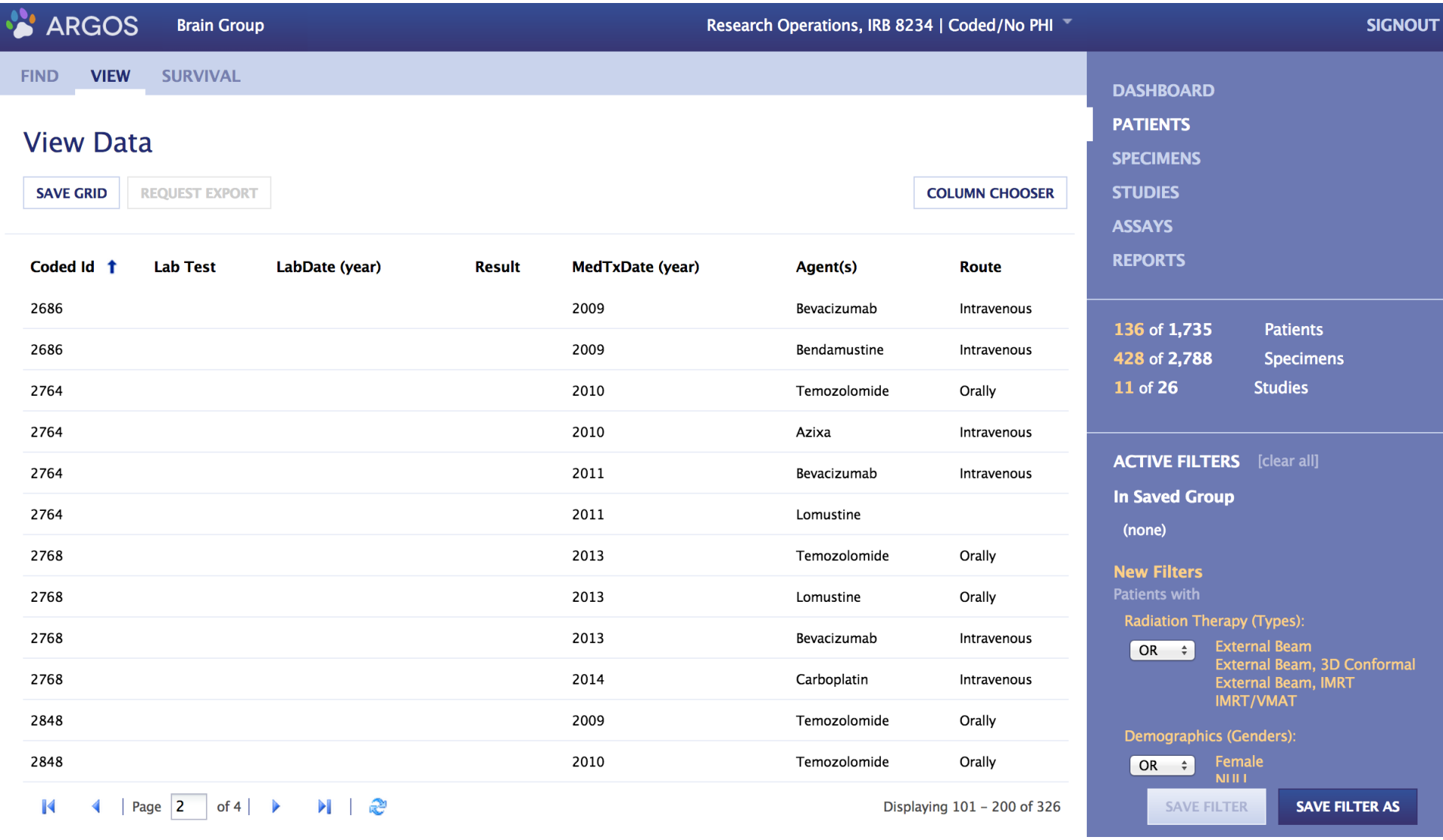
Patients with

Demographics (Genders): Male

Demographics (Ages at Diagnosis):

OR 40
50
60
70


ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
View Data
SAVE GRID
REQUEST EXPORT
Column Chooser
Source
Demographics
Diagnostics
Encounters
Lab Tests
Medical Therapy
Medications
Variables
Select All
MedTxDate (year)
MedTxStopDate (year)
Protocol #
Route
Schedule
Definition: Route
Route for medical therapy
CANCEL
OK
DASHBOARD
Patients
Specimens
Studies
FILTERS
[clear all]
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
Demographics (Genders):
OR
Female
SAVE FILTER
SAVE FILTER AS


ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
View Data
SAVE GRID
REQUEST EXPORT
COLUMN CHOOSER
Coded Id
Lab Test
LabDate (year)
Result
MedTxDate (year)
Agent(s)
Route
2686 2009 Bevacizumab Intravenous
2686 2009 Bendamustine Intravenous
2764 2010 Temozolomide Orally
2764 2010 Azixa Intravenous
2764 2011 Bevacizumab Intravenous
2764 2011 Lomustine
2768 2013 Temozolomide Orally
2768 2013 Lomustine Orally
2768 2013 Bevacizumab Intravenous
2768 2014 Carboplatin Intravenous
2848 2009 Temozolomide Orally
2848 2010 Temozolomide Orally
Page 2 of 4
Displaying 101 – 200 of 326
136 of 1,735 Patients
428 of 2,788 Specimens
11 of 26 Studies
ACTIVE FILTERS [clear all]
In Saved Group
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New Filters
Patients with
Radiation Therapy (Types):
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
Demographics (Genders):
OR
Female
SAVE FILTER
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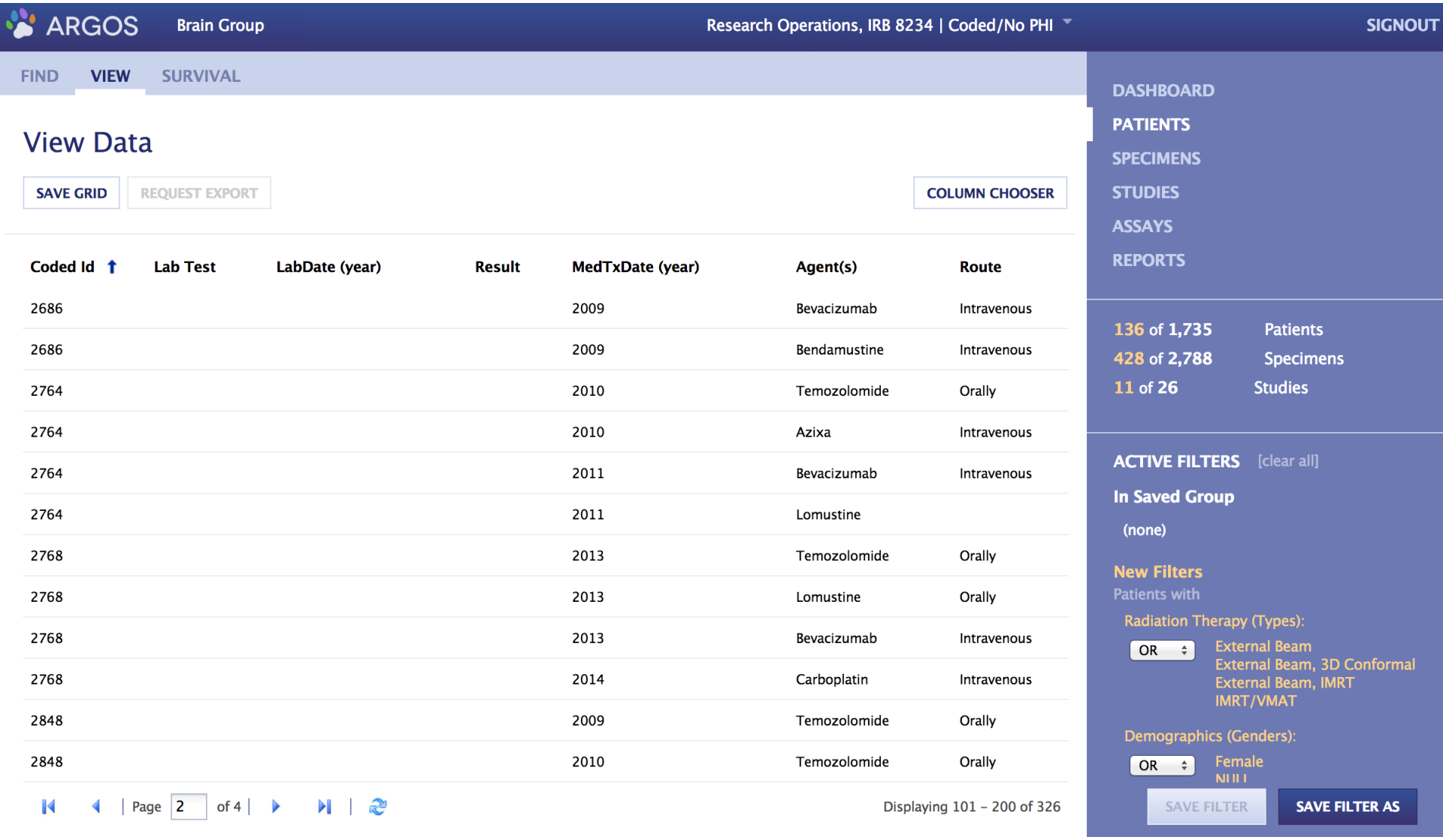
ARGOS
Brain Group
Research Operations, IRB 8234 | Coded/No PHI
SIGNOUT
FIND
VIEW
SURVIVAL
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
View Data
SAVE GRID
REQUEST EXPORT
COLUMN CHOOSER
Coded Id
Lab Test
LabDate (year)
Result
MedTxDate (year)
Agent(s)
Route
2686 2009 Bevacizumab Intravenous
2686 2009 Bendamustine Intravenous
2764 2010 Temozolomide Orally
2764 2010 Azixa Intravenous
2764 2011 Bevacizumab Intravenous
2764 2011 Lomustine
2768 2013 Temozolomide Orally
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2768 2013 Bevacizumab Intravenous
2768 2014 Carboplatin Intravenous
2848 2009 Temozolomide Orally
2848 2010 Temozolomide Orally
Page 2 of 4
Displaying 101 – 200 of 326
136 of 1,735 Patients
428 of 2,788 Specimens
11 of 26 Studies
ACTIVE FILTERS [clear all]
In Saved Group
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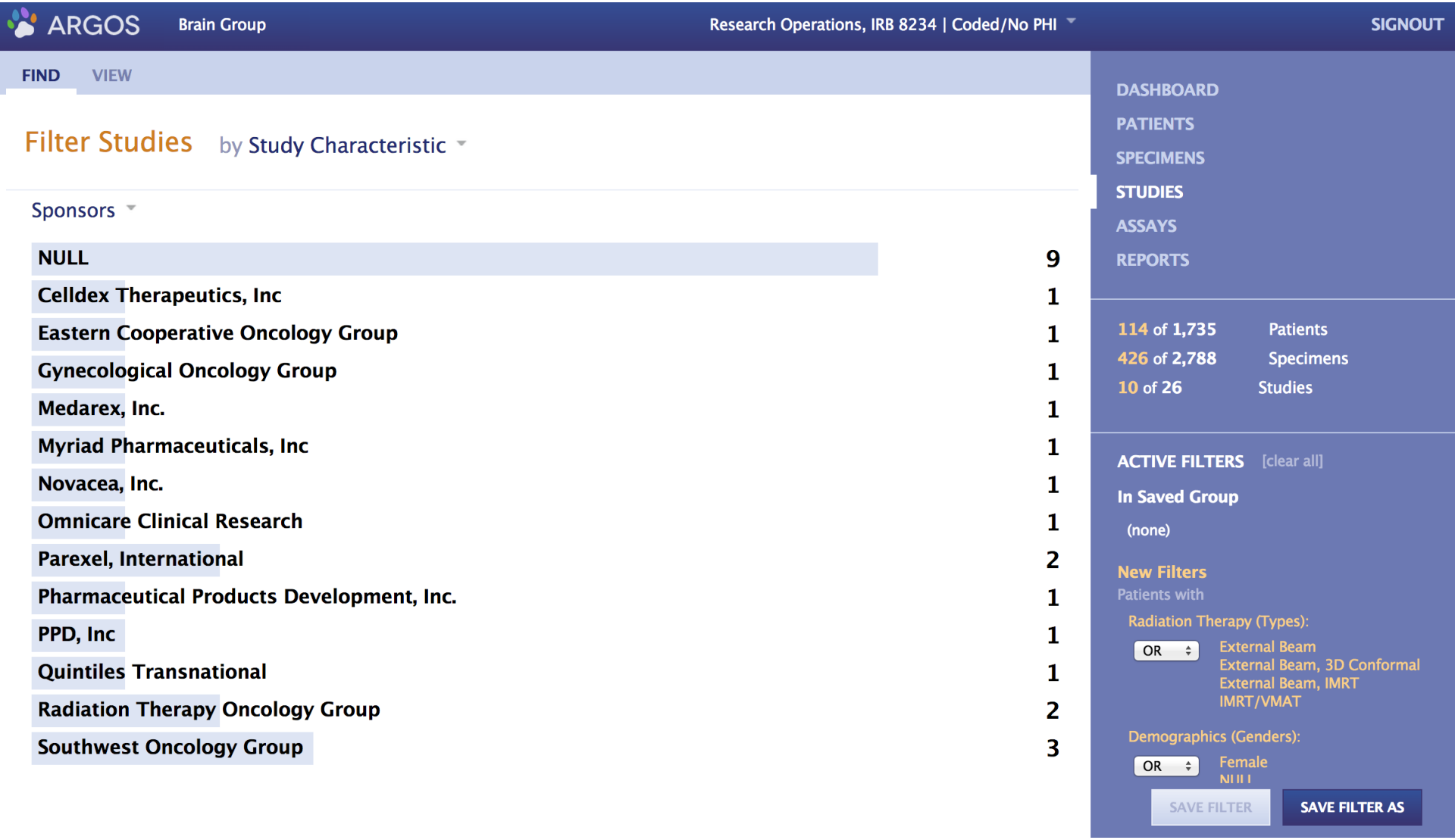
New Filters
Patients with
Radiation Therapy (Types):
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
Demographics (Genders):
OR
Female
SAVE FILTER
SAVE FILTER AS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FIND
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Filter Studies
by Study Characteristic
Sponsors
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Eastern Cooperative Oncology Group 1
Gynecological Oncology Group 1
Medarex, Inc. 1
Myriad Pharmaceuticals, Inc 1
Novacea, Inc. 1
Omnicare Clinical Research 1
Parexel, International 2
Pharmaceutical Products Development, Inc. 1
PPD, Inc 1
Quintiles Transnational 1
Radiation Therapy Oncology Group 2
Southwest Oncology Group 3
DASHBOARD
PATIENTS
SPECIMENS
STUDIES
ASSAYS
REPORTS
114 of 1,735 Patients
426 of 2,788 Specimens
10 of 26 Studies
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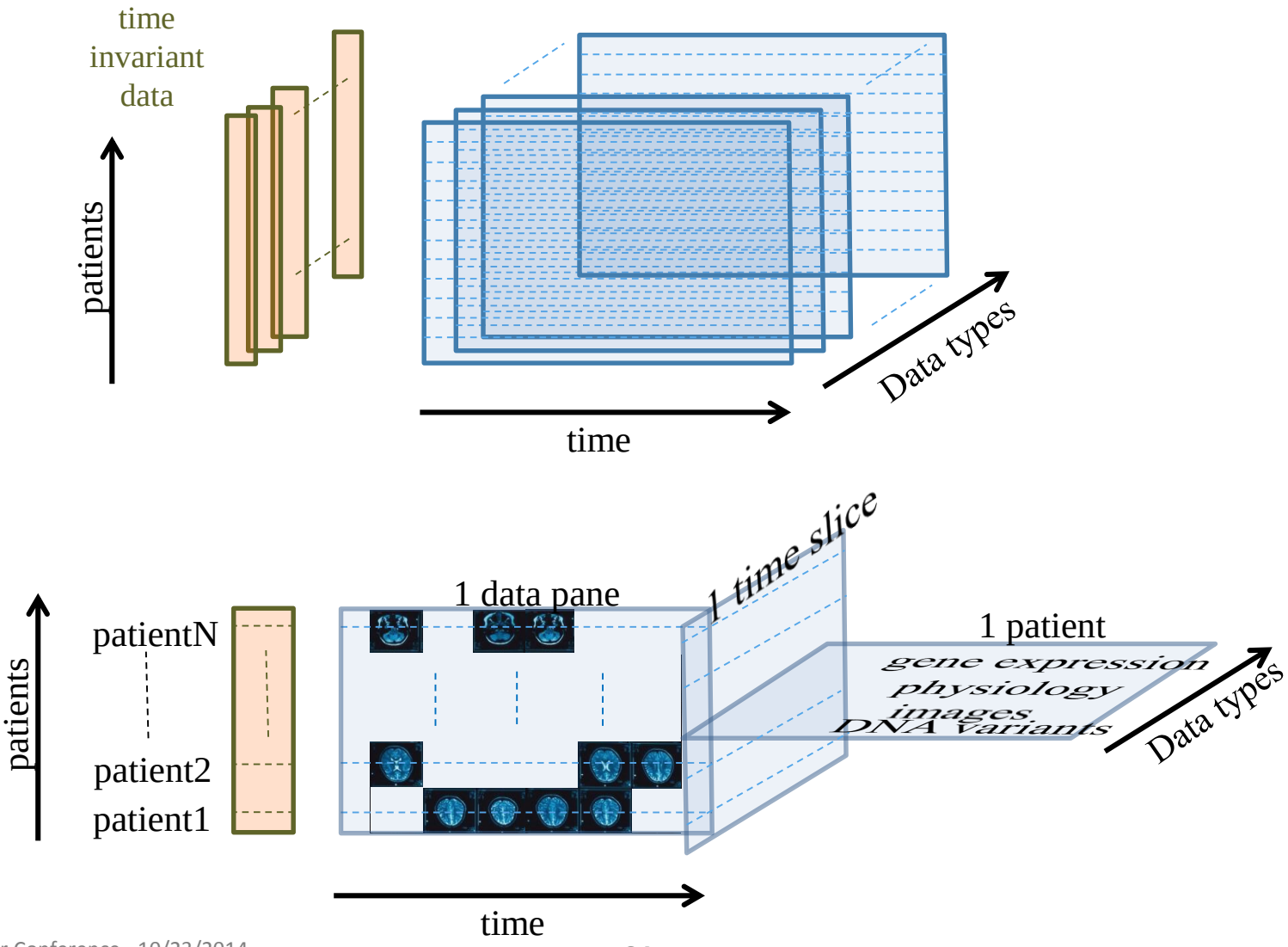
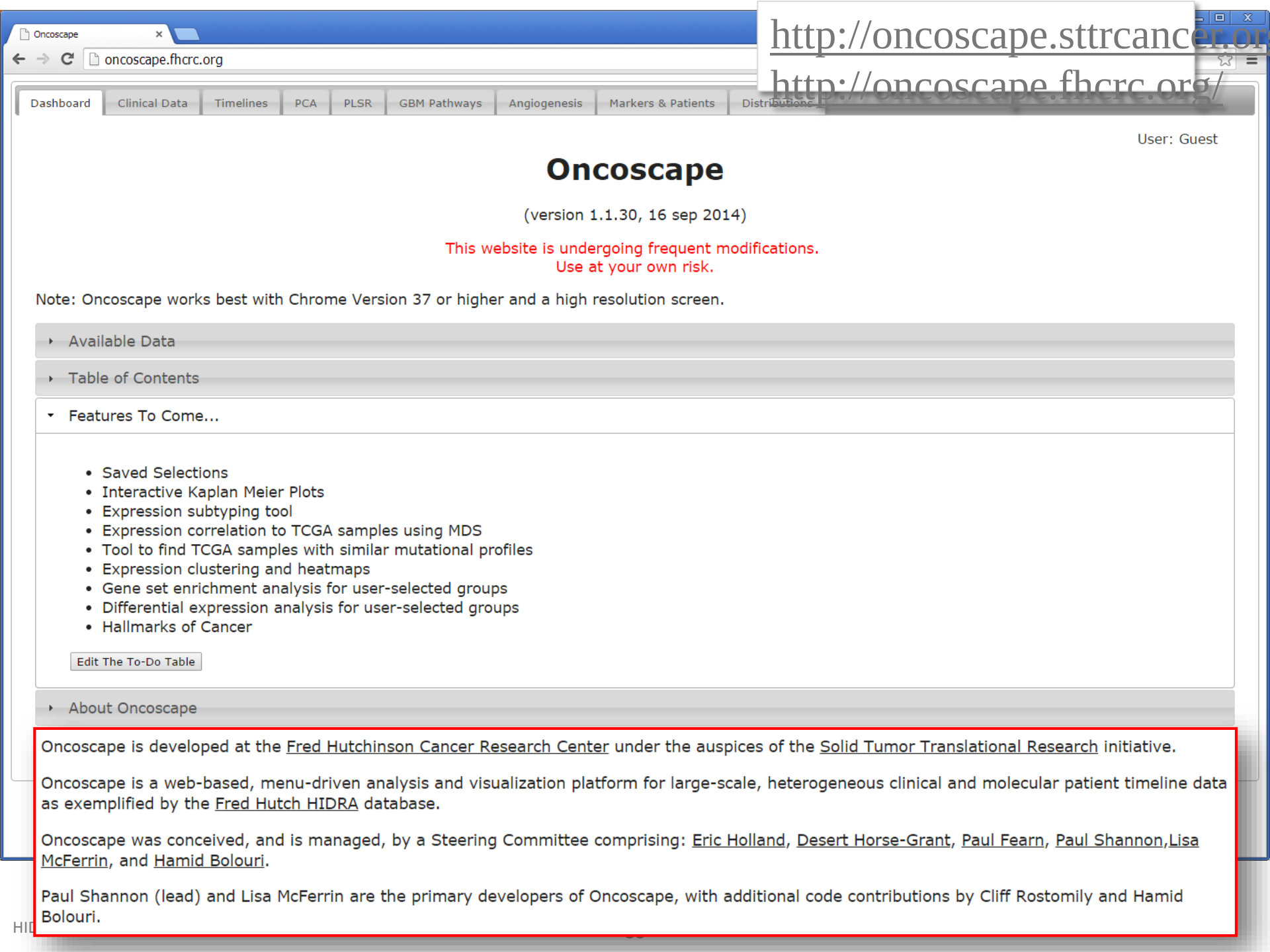
New Filters
Patients with
Radiation Therapy (Types):
OR
External Beam
External Beam, 3D Conformal
External Beam, IMRT
IMRT/VMAT
Demographics (Genders):
OR
Female
SAVE FILTER
SAVE FILTER AS

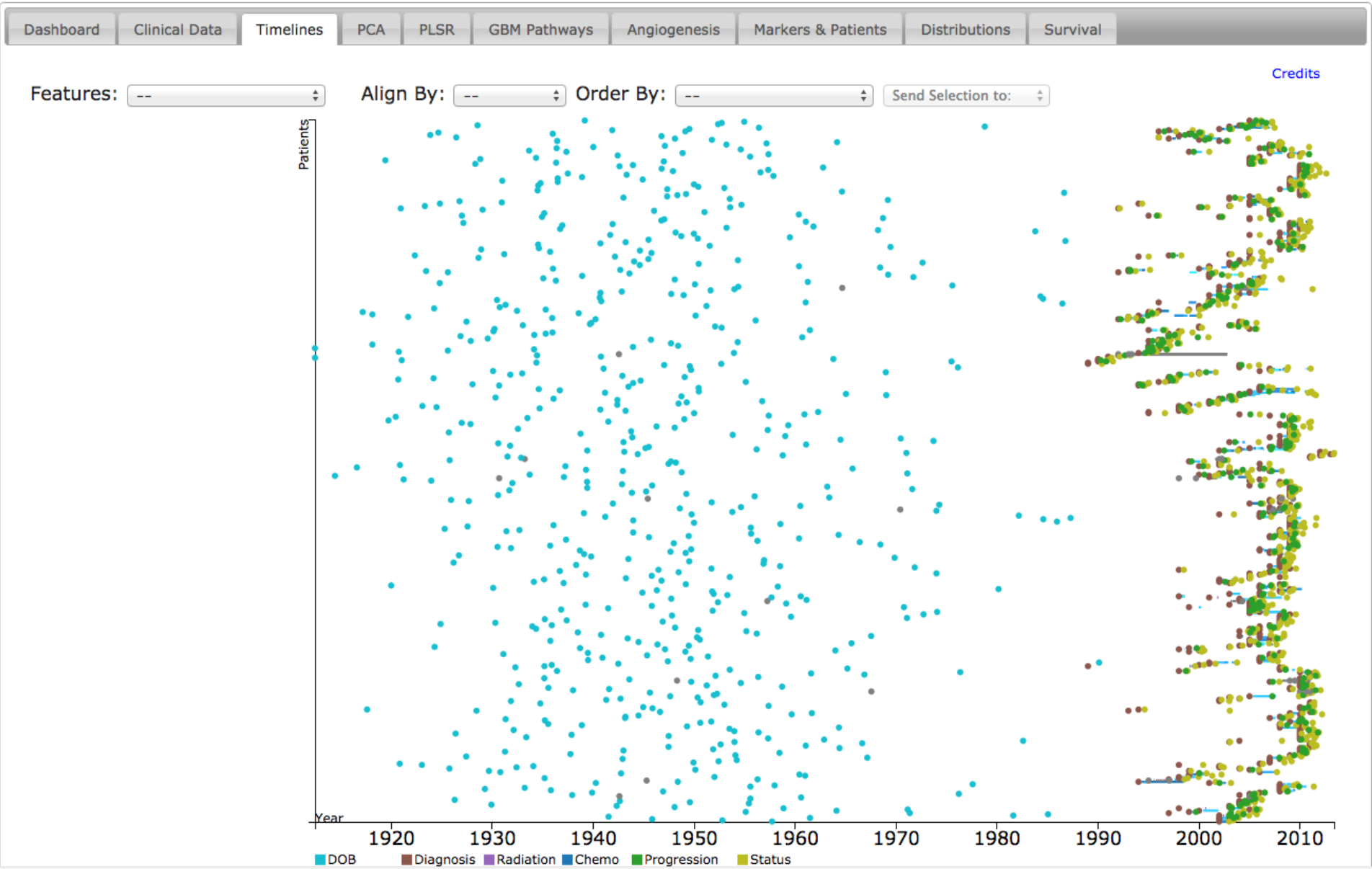
Oncoscape

- Research and Innovation framework for rapid prototyping of features
- Candidate features for migration to Argos on LabKey Server (e.g. patient timelines graph)

a menu-driven, web-based, platform for exploration & analysis of multi-dimensional clinical data




Oncoscape
oncoscape.fhcrc.org
http://oncoscape.sttrcancer.org
http://oncoscape.fhcrc.org/
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
User: Guest
Oncoscape
(version 1.1.30, 16 sep 2014)
This website is undergoing frequent modifications.
Use at your own risk.
Note: Oncoscape works best with Chrome Version 37 or higher and a high resolution screen.
Available Data
Table of Contents
Features To Come...
Saved Selections
Interactive Kaplan Meier Plots
Expression subtyping tool
Expression correlation to TCGA samples using MDS
Tool to find TCGA samples with similar mutational profiles
Expression clustering and heatmaps
Gene set enrichment analysis for user-selected groups
Differential expression analysis for user-selected groups
Hallmarks of Cancer
Edit The To-Do Table
About Oncoscape
Oncoscape is developed at the Fred Hutchinson Cancer Research Center under the auspices of the Solid Tumor Translational Research initiative.
Oncoscape is a web-based, menu-driven analysis and visualization platform for large-scale, heterogeneous clinical and molecular patient timeline data as exemplified by the Fred Hutch HIDRA database.
Oncoscape was conceived, and is managed, by a Steering Committee comprising: Eric Holland, Desert Horse-Grant, Paul Fearn, Paul Shannon,Lisa McFerrin, and Hamid Bolouri.
Paul Shannon (lead) and Lisa McFerrin are the primary developers of Oncoscape, with additional code contributions by Cliff Rostomily and Hamid Bolouri.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Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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Order By: --
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1930
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DOB
Diagnosis
Radiation
Chemo
Progression
Status


Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
Features: --
Align By: --
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Patients
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1990
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1996
1998
2000
2002
2004
2006
2008
2010
2012
DOB
Diagnosis
Radiation
Chemo
Progression
Status


Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Diagnosis
Status
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Radiation
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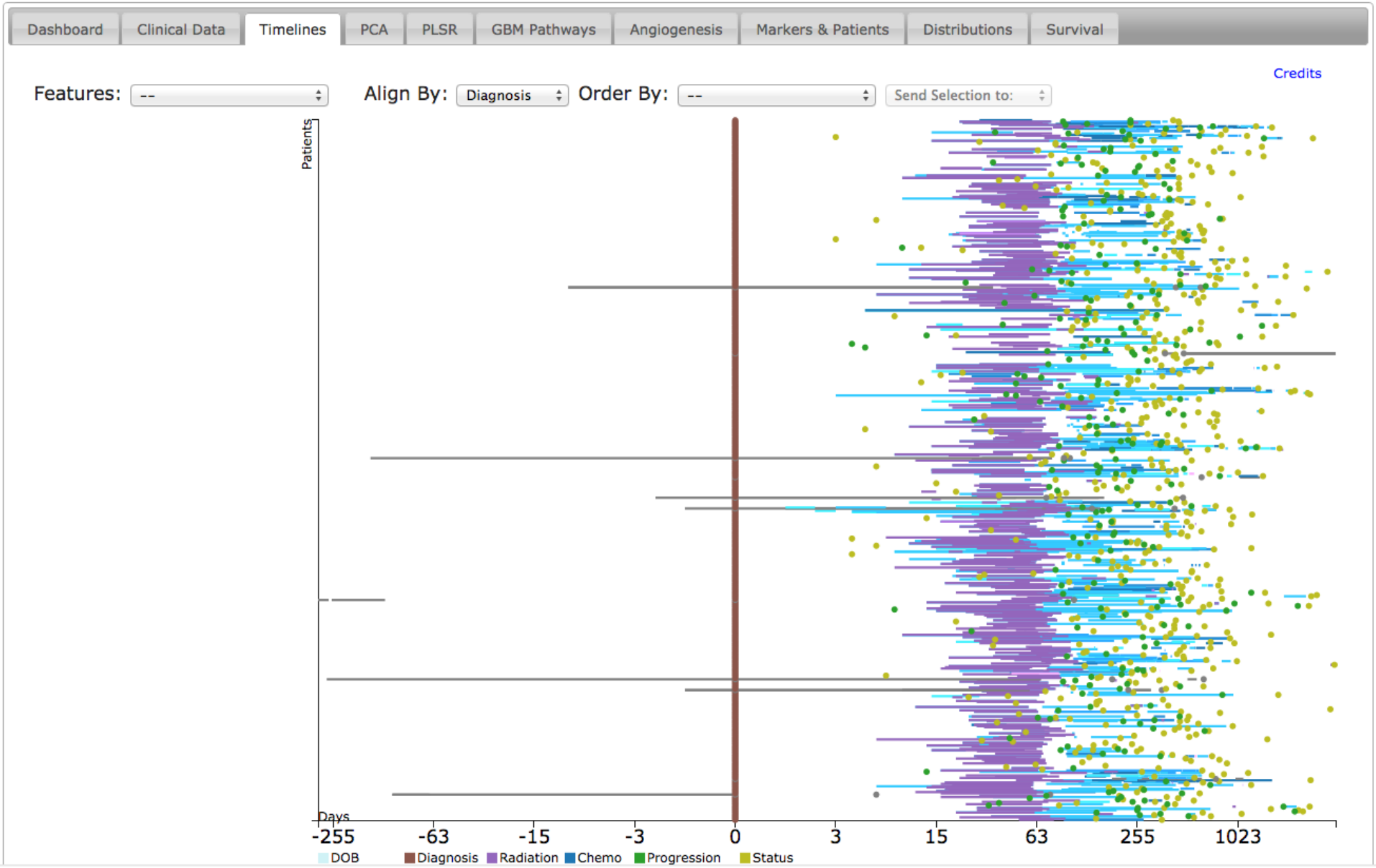
Diagnosis
Radiation
Chemo
Progression
Status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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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Order By: --
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Diagnosis
Radiation
Chemo
Progression
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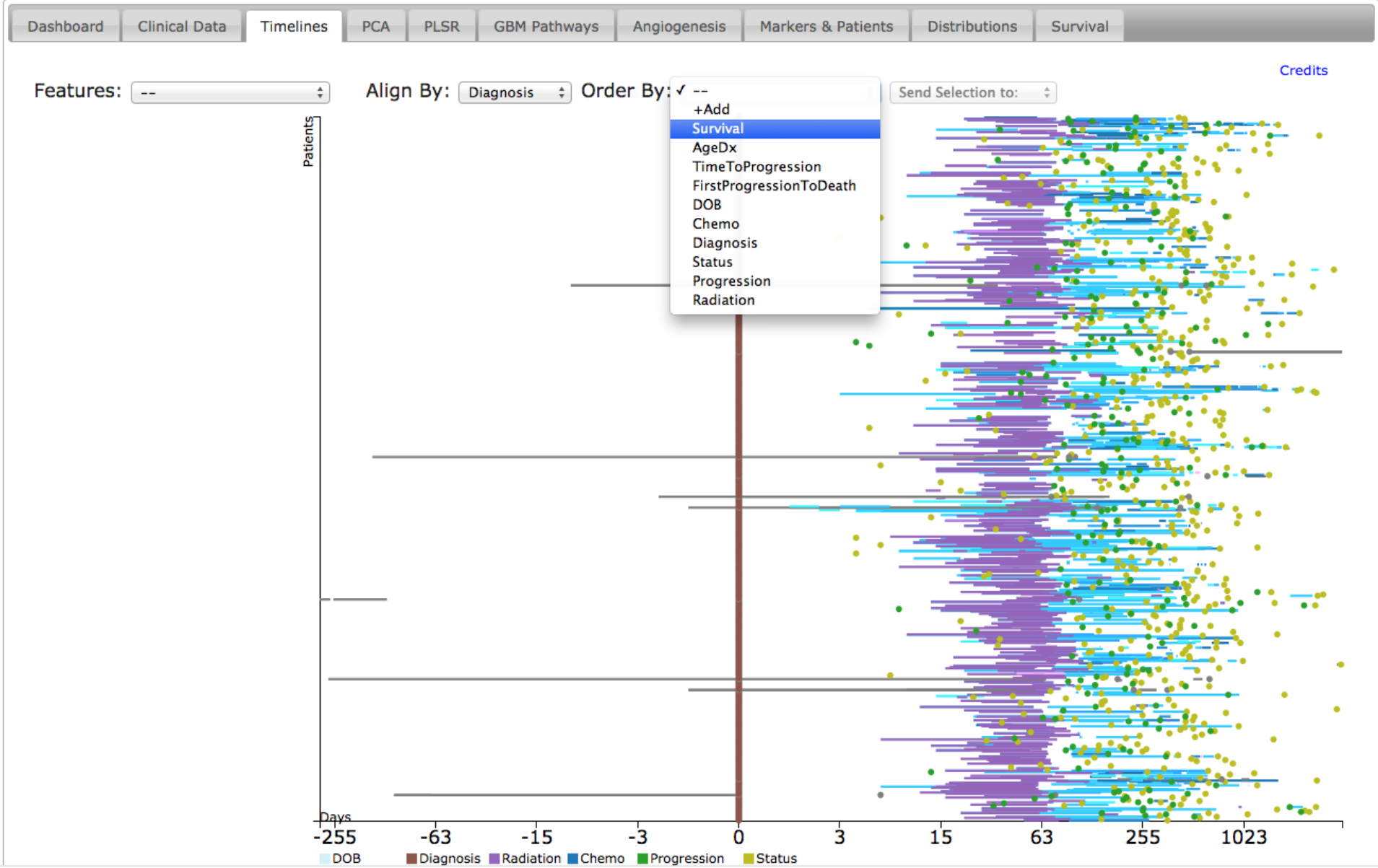
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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AgeDx
TimeToProgression
FirstProgressionToDeath
DOB
Chemo
Diagnosis
Status
Progression
Radiation
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Radiation
Chemo
Progression
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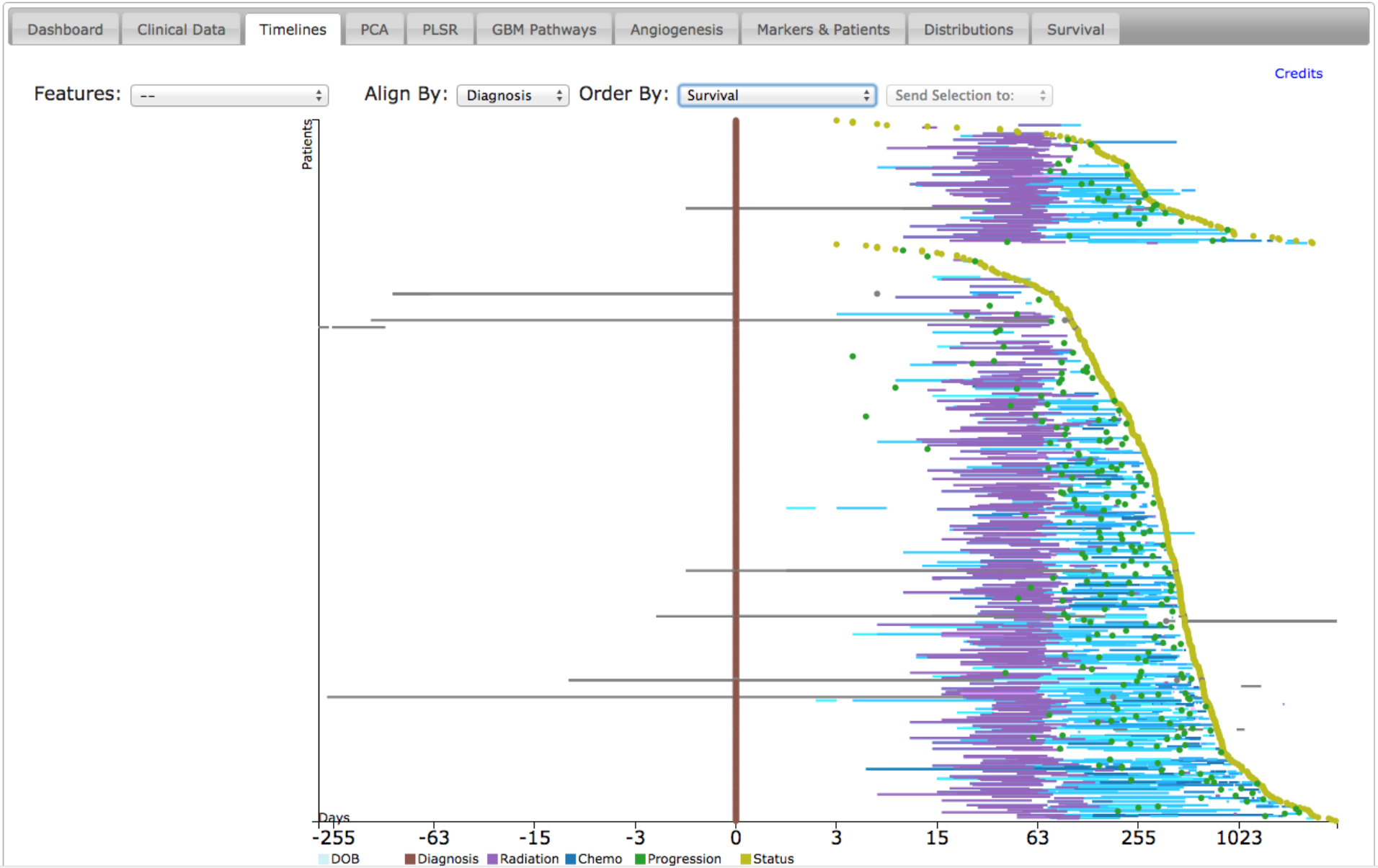
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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Order By: Survival
Send Selection to:
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Radiation
Chemo
Progression
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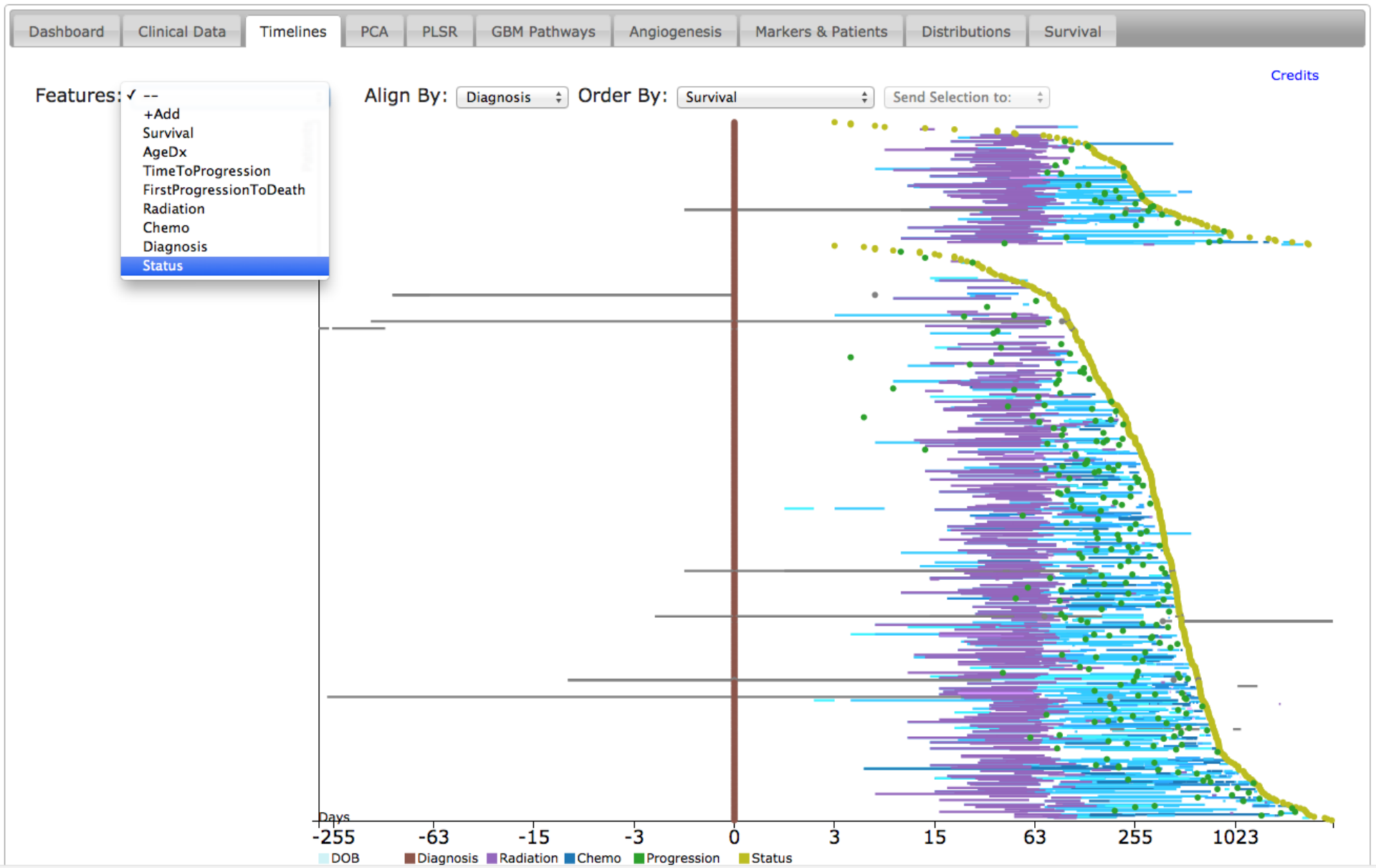
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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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AgeDx
TimeToProgression
FirstProgressionToDeath
Radiation
Chemo
Diagnosis
Status
Align By: Diagnosis
Order By: Survival
Send Selection to:
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DOB
Diagnosis
Radiation
Chemo
Progression
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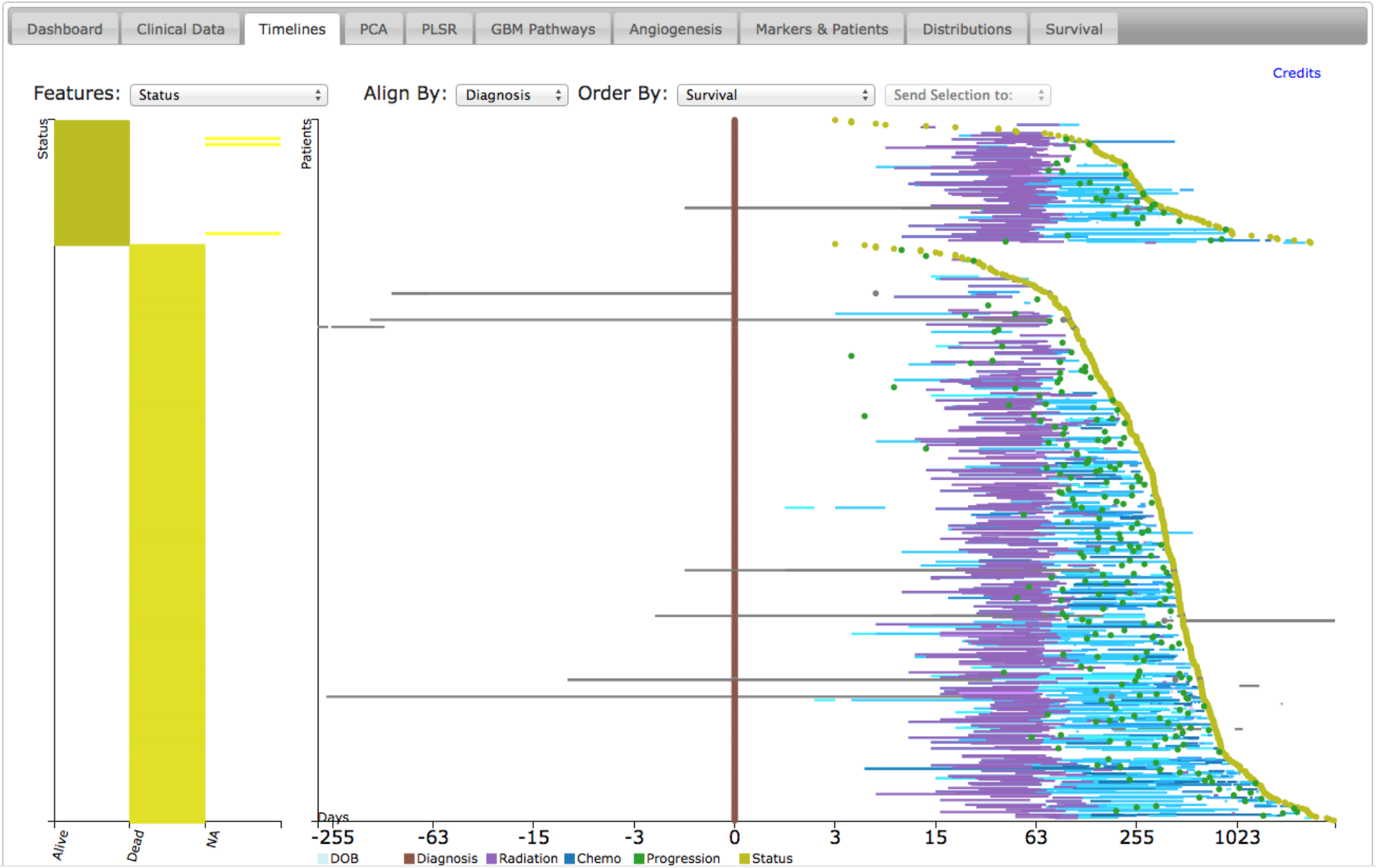
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Chemo
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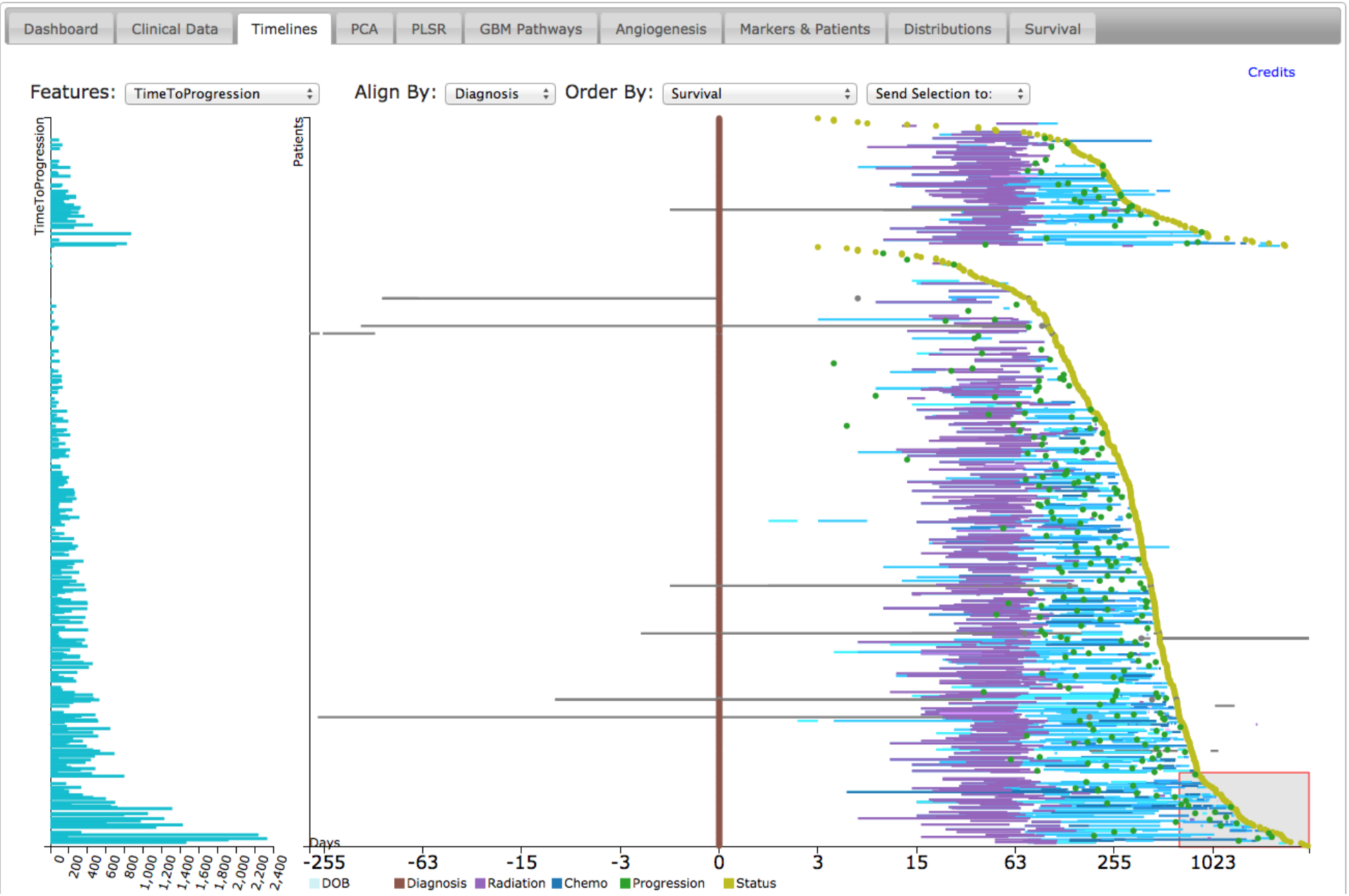
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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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Order By: Survival
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DOB
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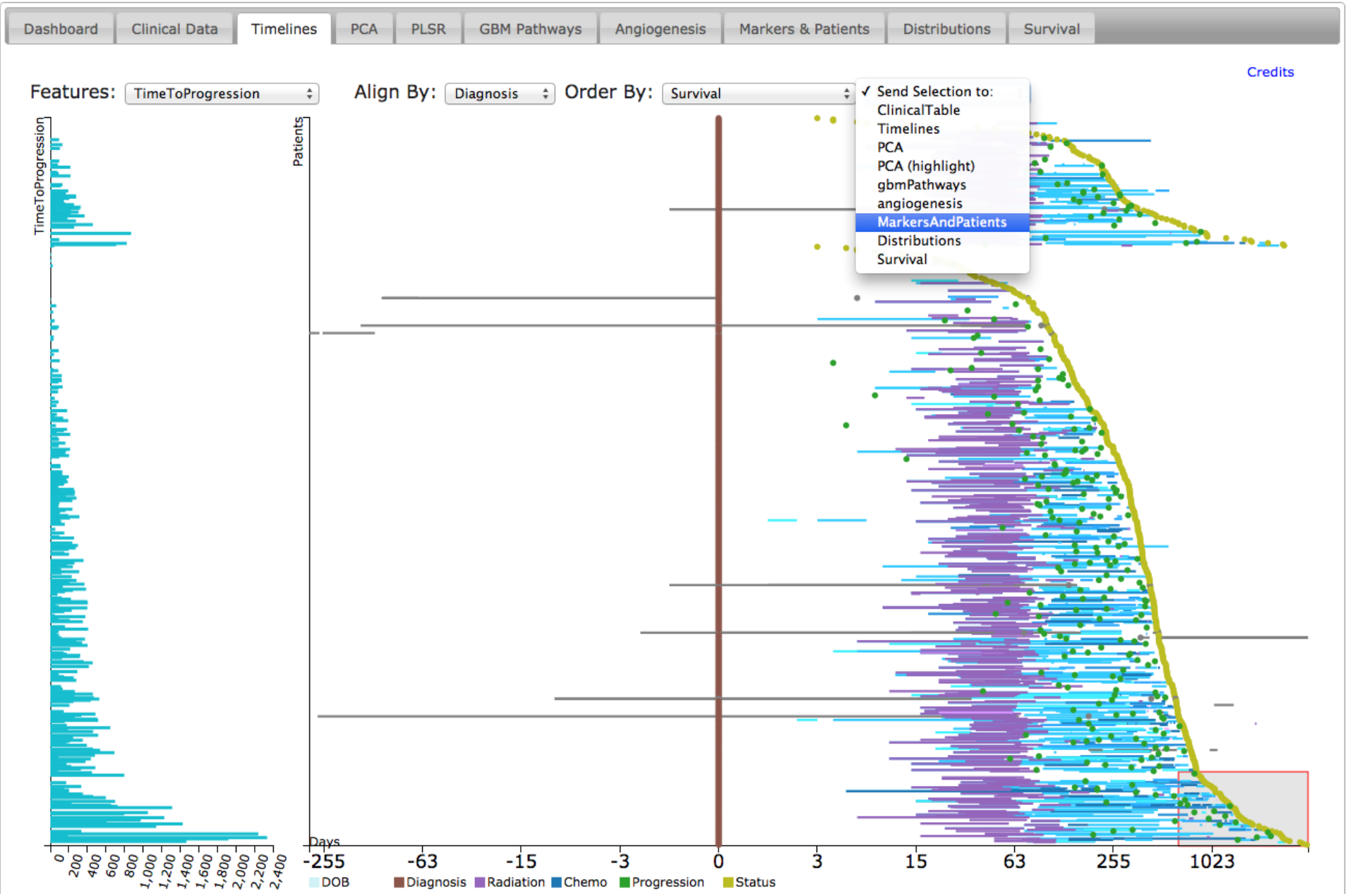
Radiation
Chemo
Progression
Status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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
Features: TimeToProgression
Align By: Diagnosis
Order By: Survival
Send Selection to:
ClinicalTable
Timelines
PCA
PCA (highlight)
gbmPathways
angiogenesis
MarkersAndPatients
Distributions
Survival
TimeToProgression
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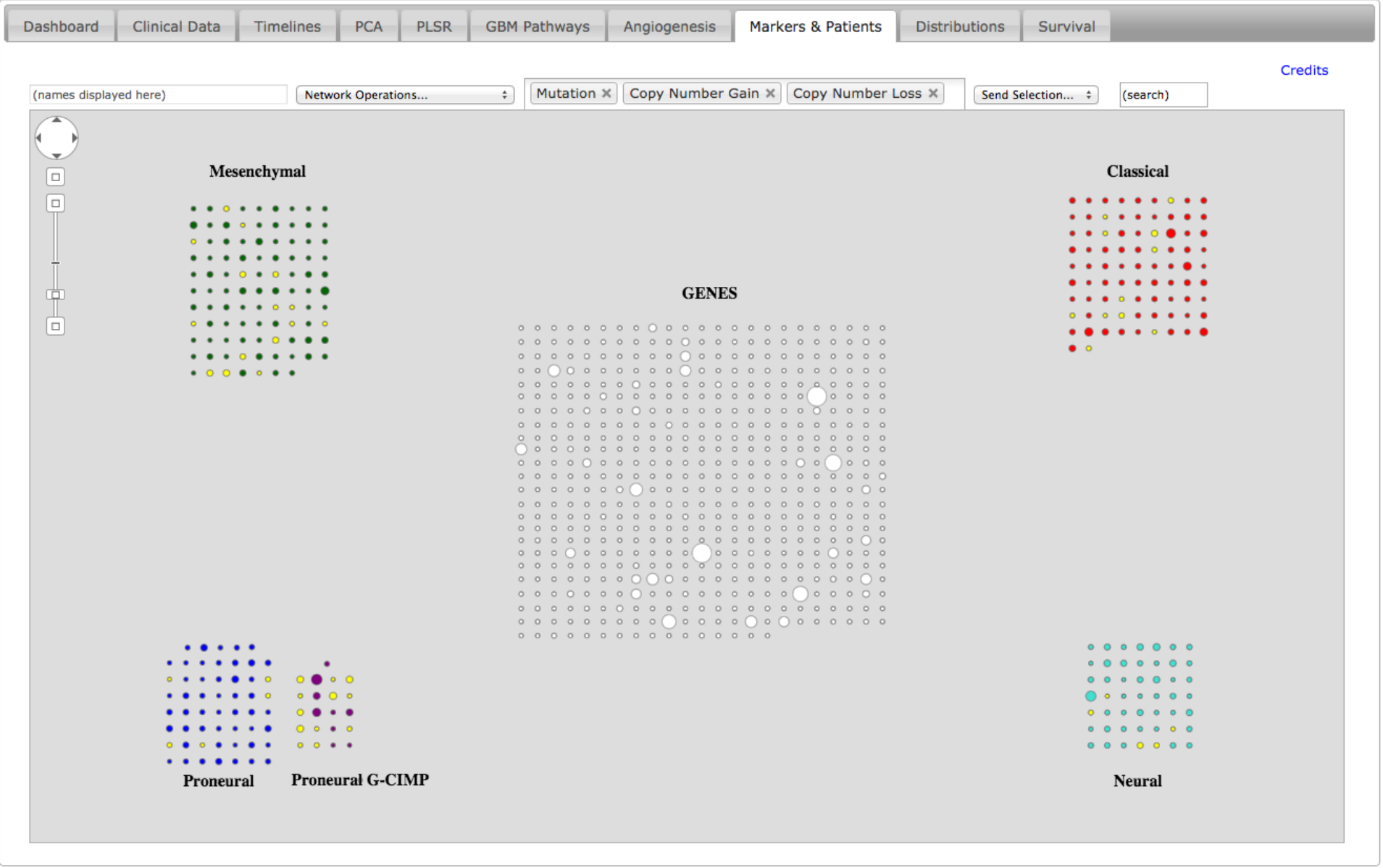
DOB
Diagnosis
Radiation
Chemo
Progression
Status



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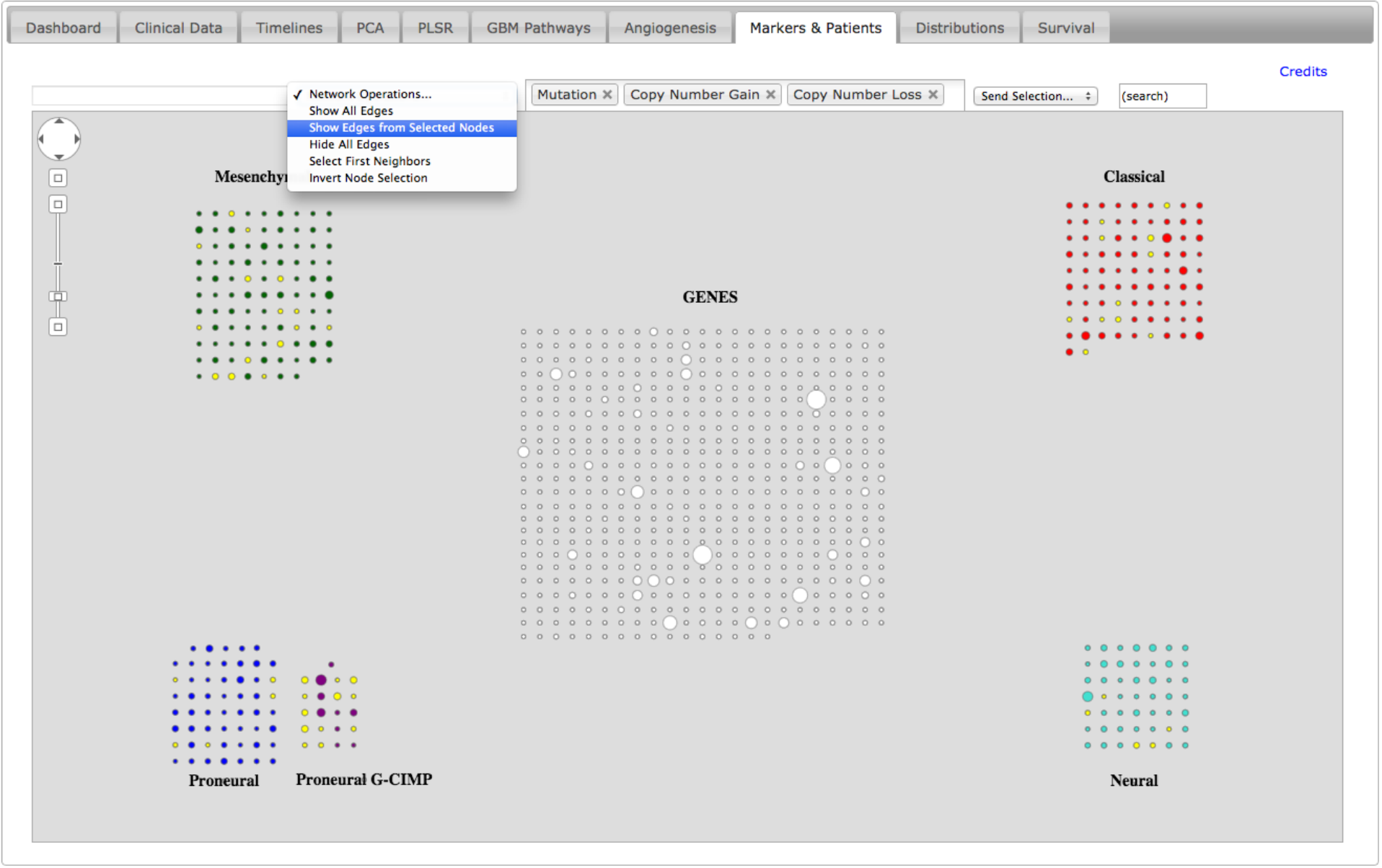
Classical: 11/83 (13%)

Proneural: 5/54 (9%)

Neural: 5/49 (10%)

G-CIMP: 12/21 (57%)


Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Show Edges from Selected Nodes
Hide All Edges
Select First Neighbors
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(search)
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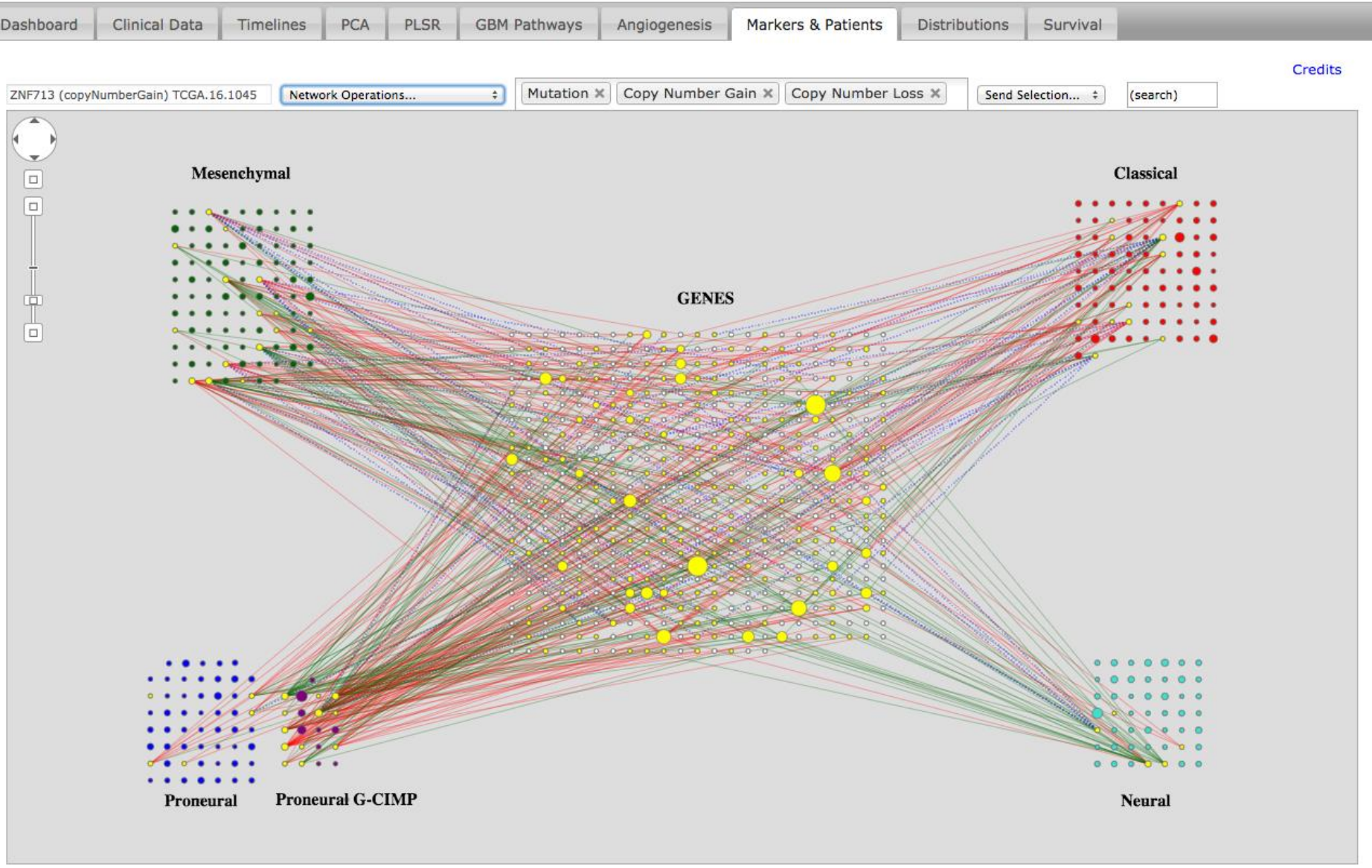
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Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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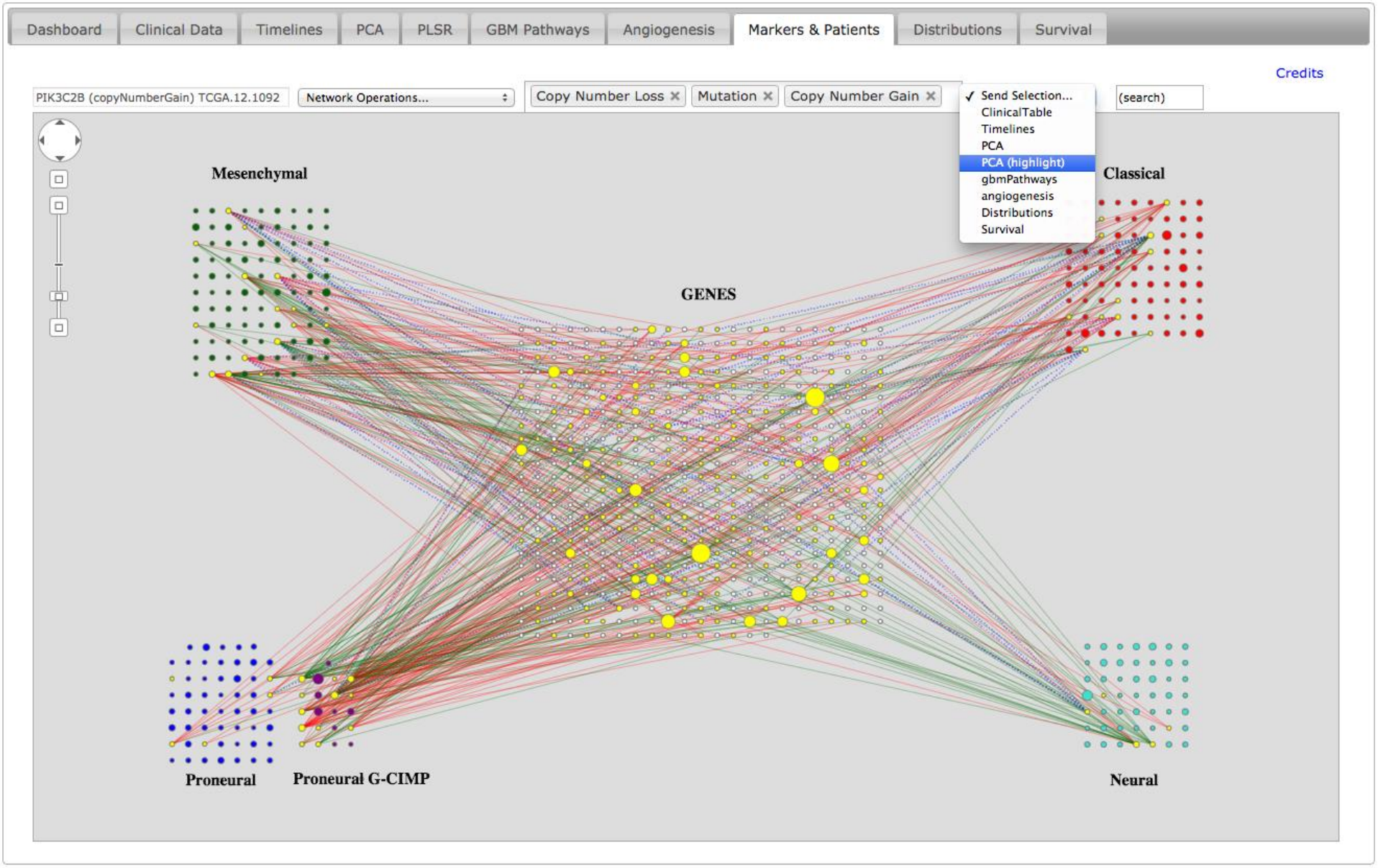
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Timelines
PCA
PLSR
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Angiogenesis
Markers & Patients
Distributions
Survival
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Timelines
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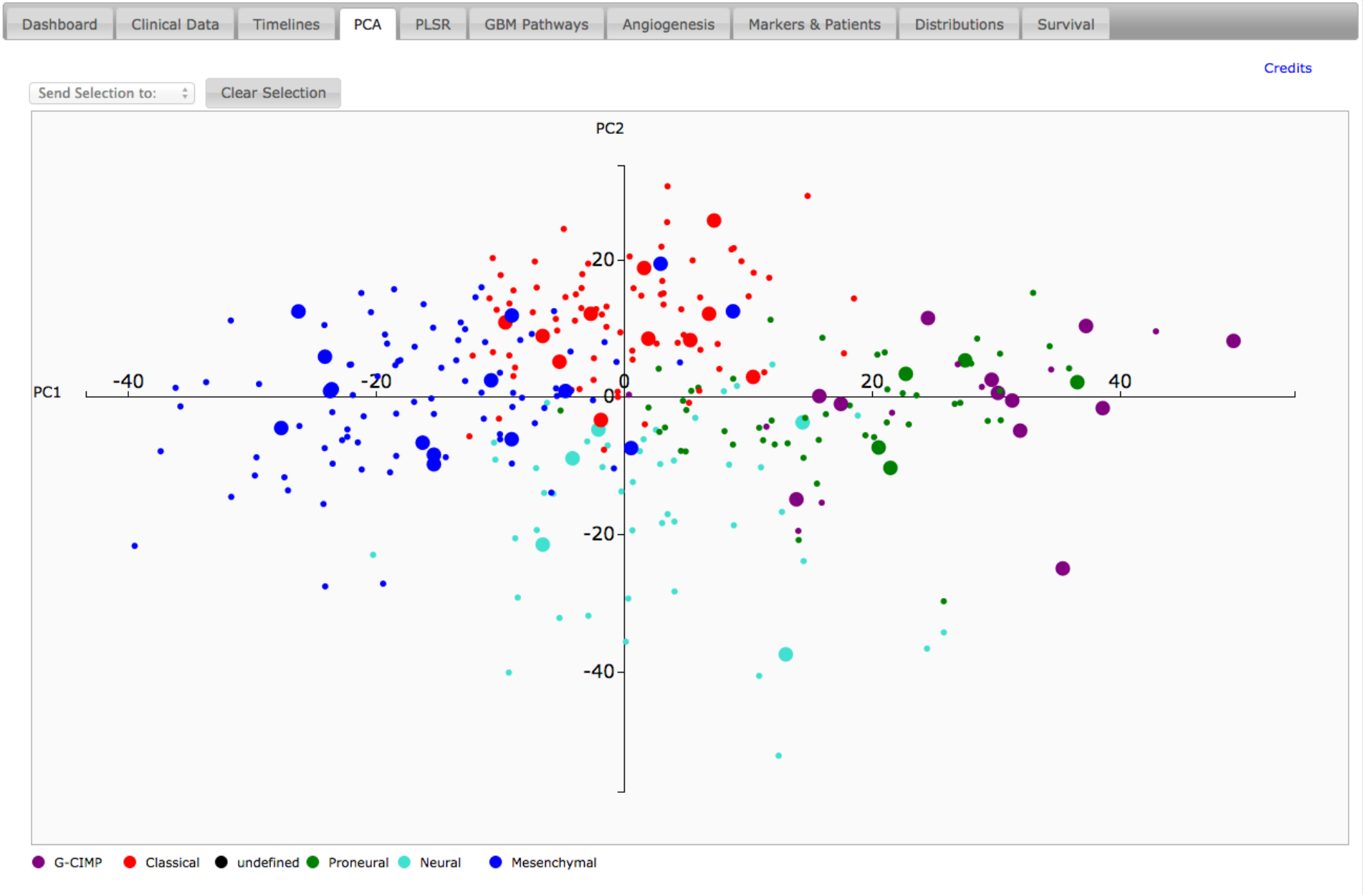
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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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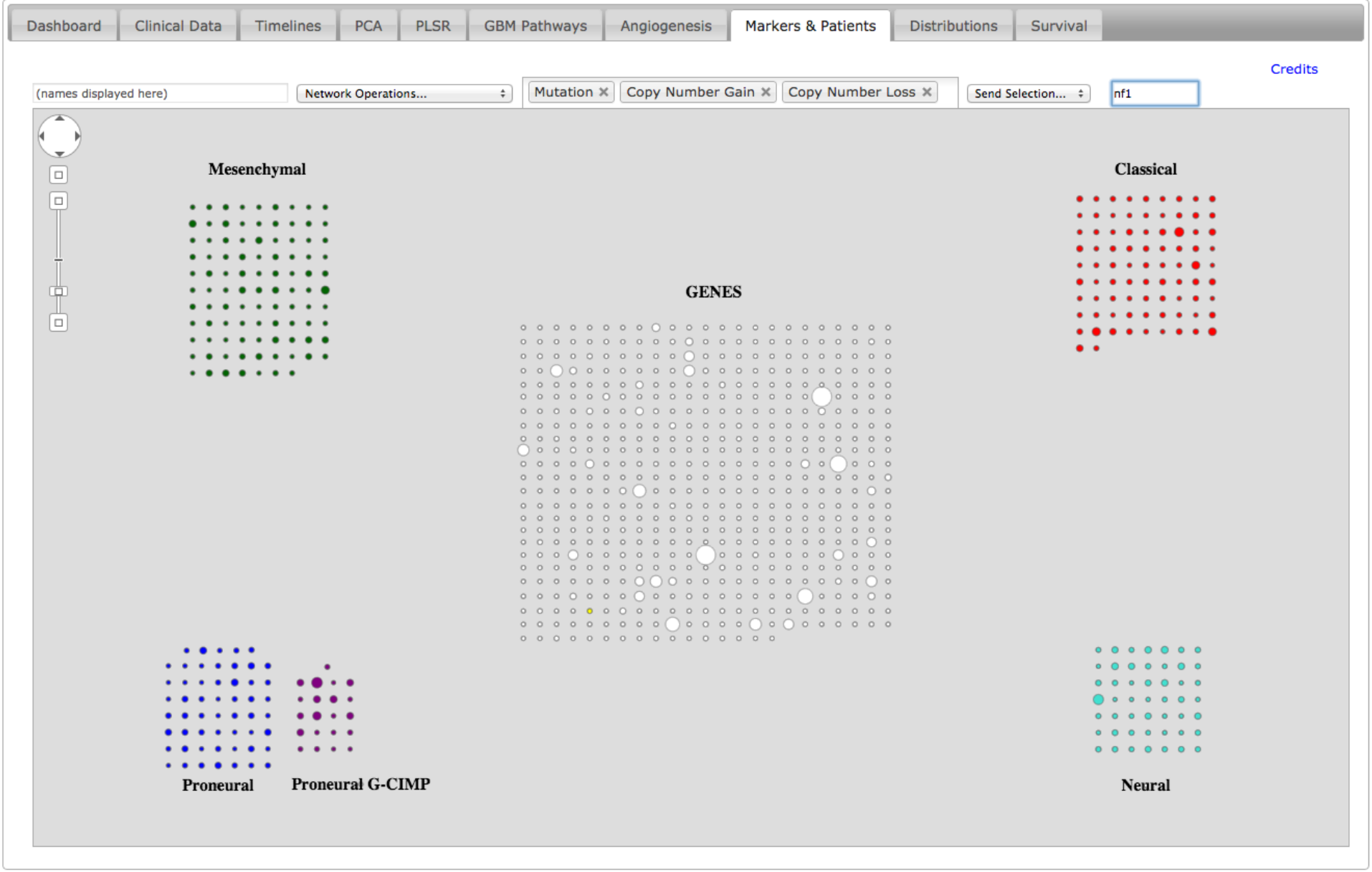
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Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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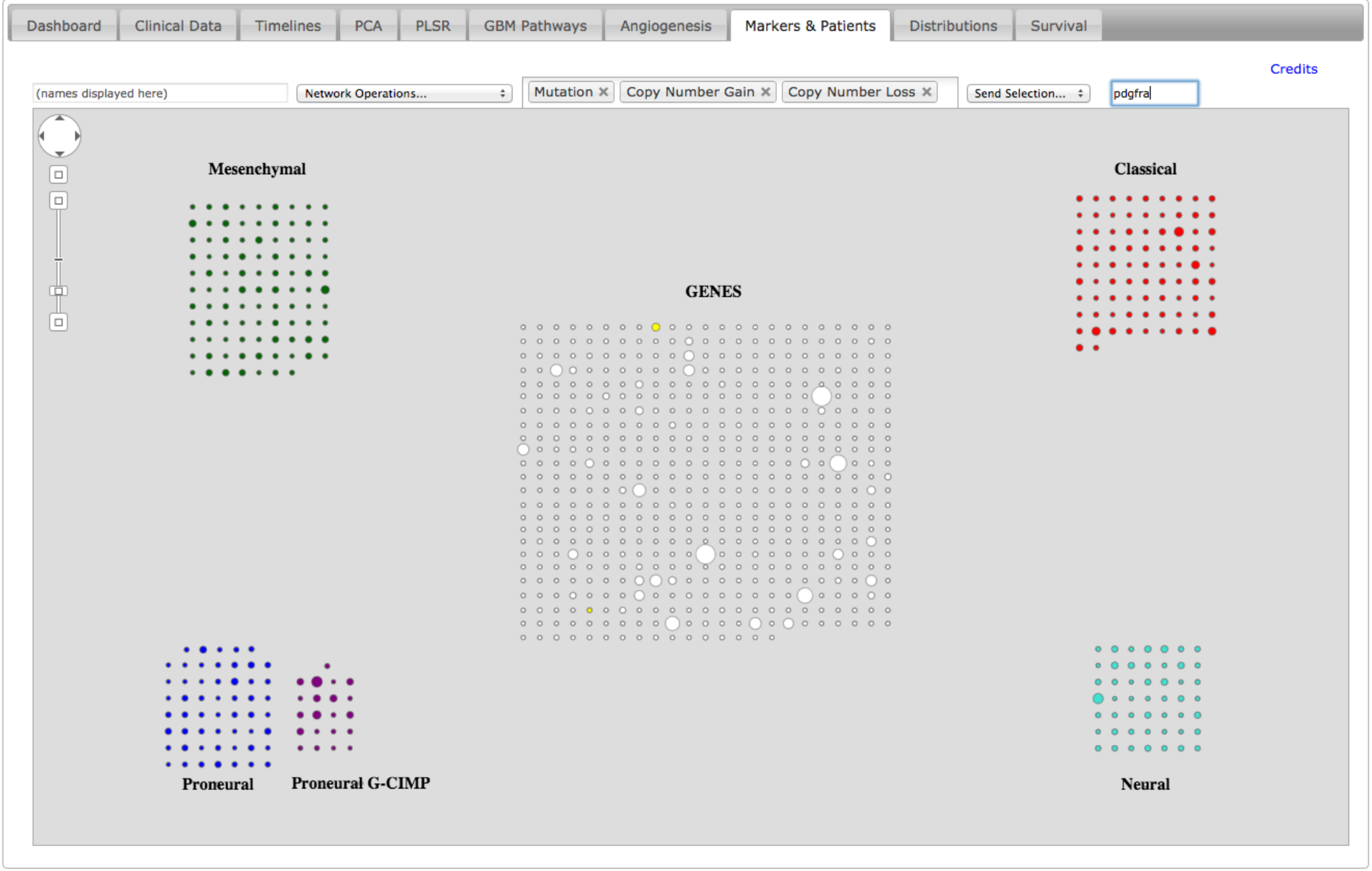
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Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
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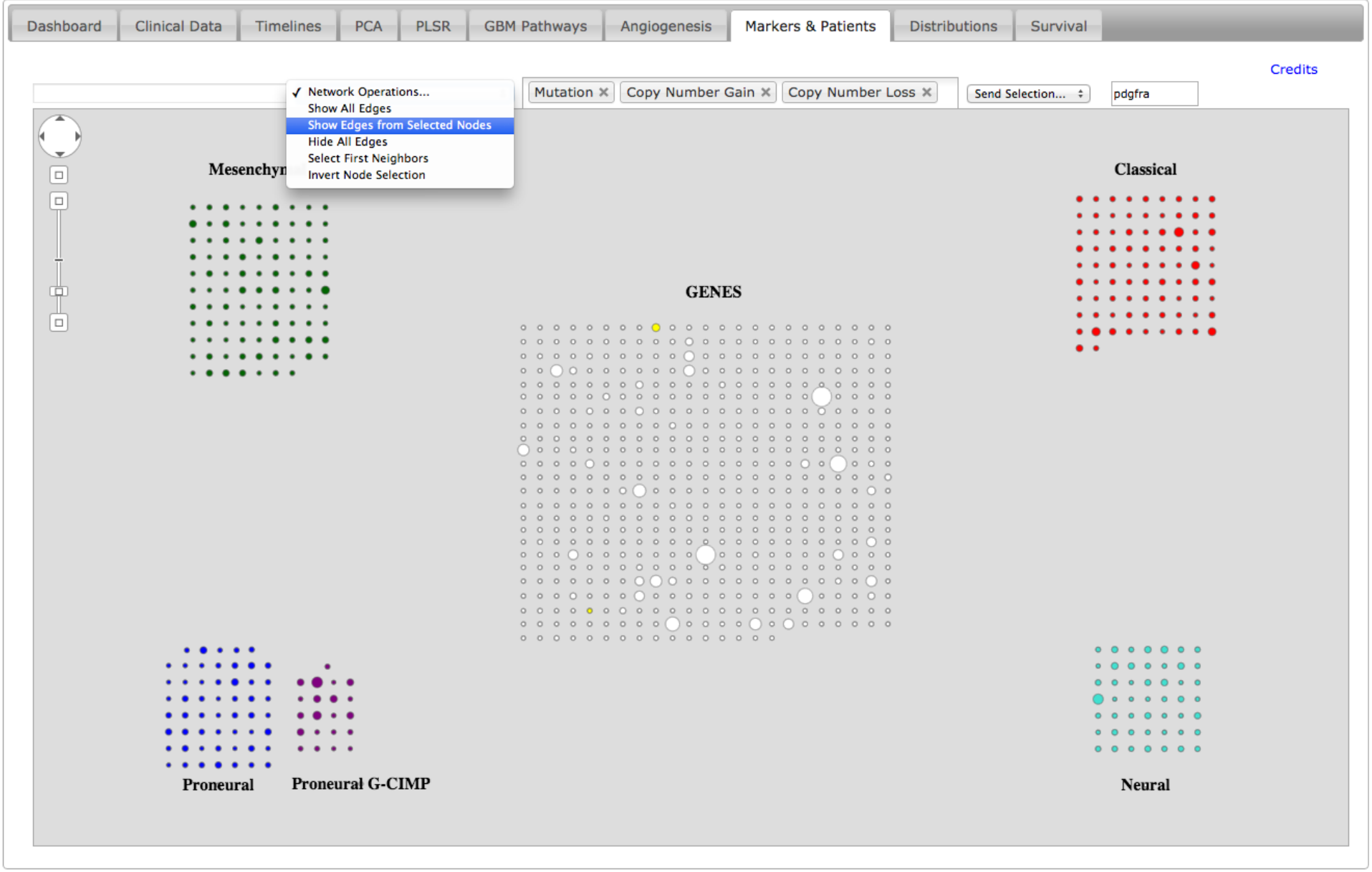
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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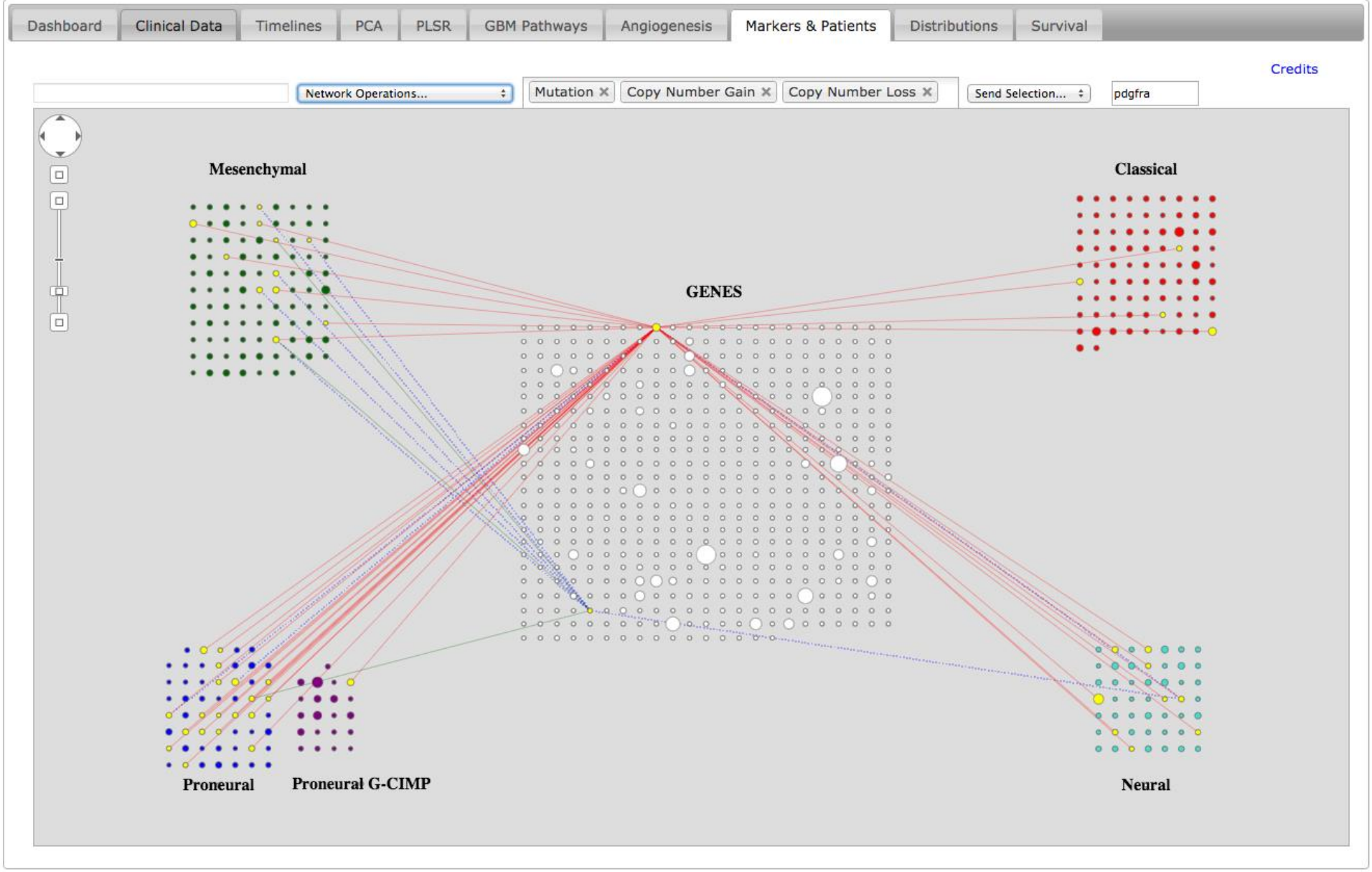
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
Network Operations...
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Classical
GENES
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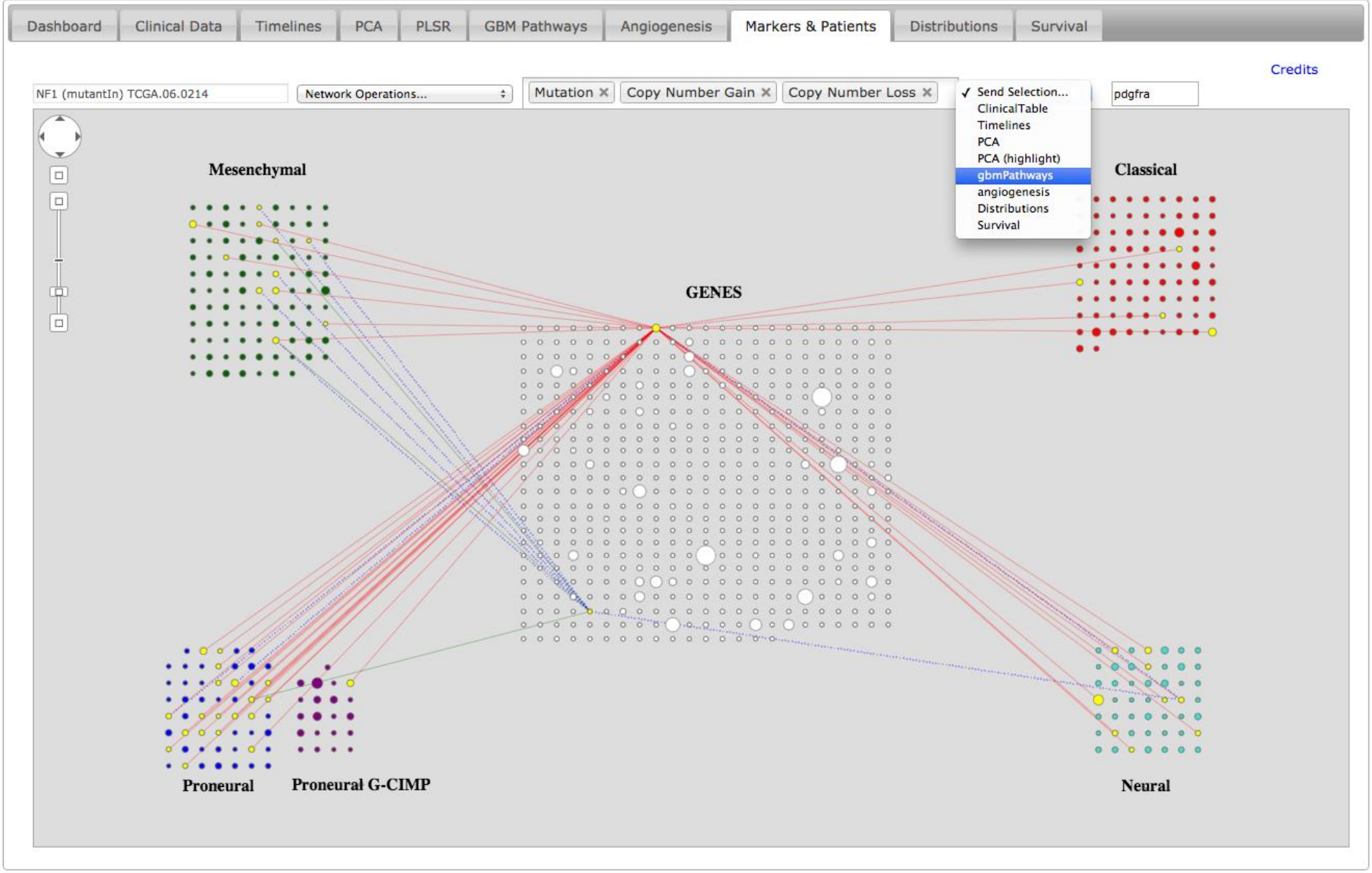
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Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Network Operations...
Mutation
Copy Number Gain
Copy Number Loss
Send Selection...
ClinicalTable
Timelines
PCA
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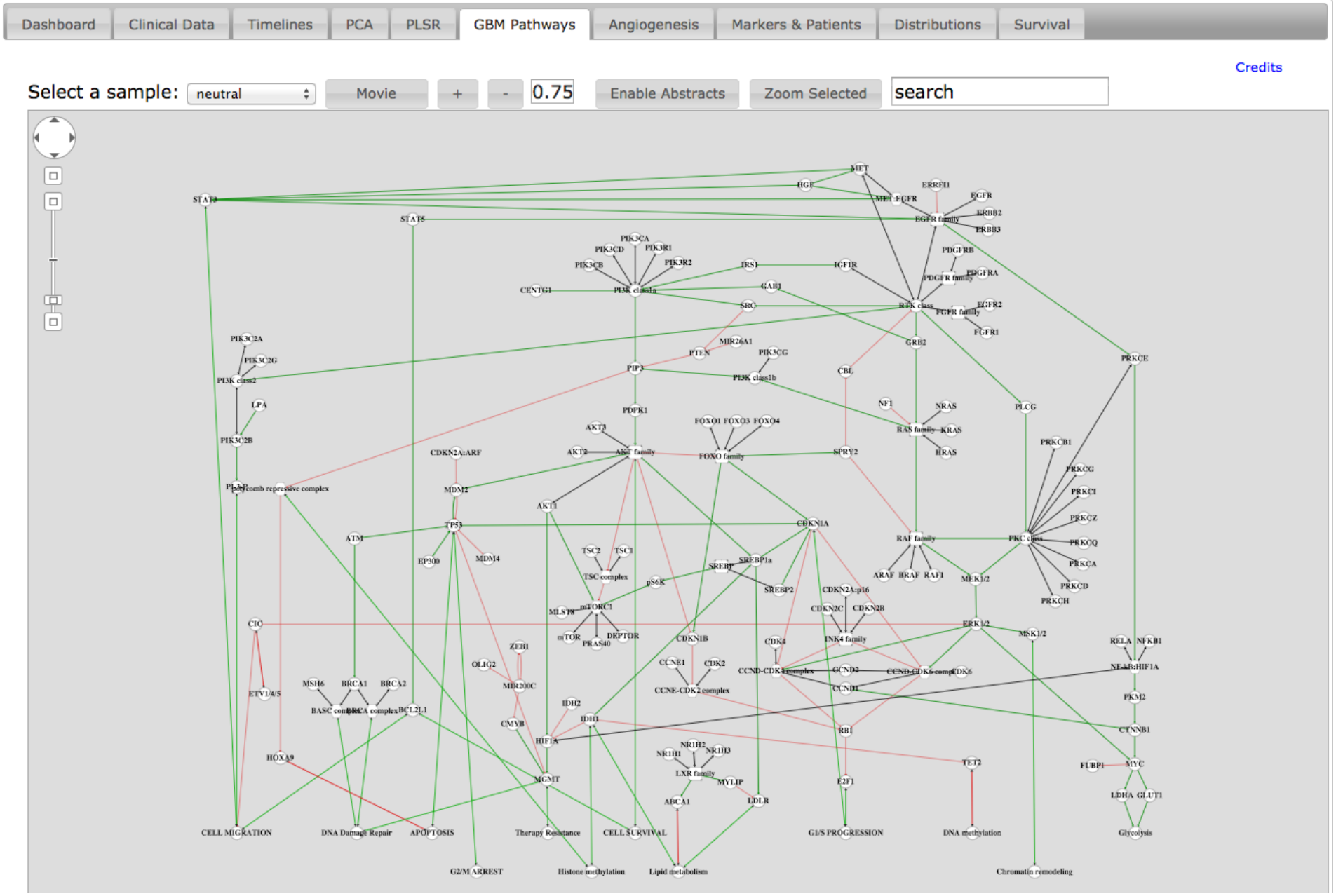
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Enable Abstracts
Zoom Selected
search
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HGF
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MET:EGFR
EGFR
ERBB2
ERBB3
EGFR family
STAT3
STAT5
PIK3CA
PIK3CD
PIK3R1
PIK3R2
PIK3CB
IRS1
IGF1R
PDGFRB
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PDGFR family
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GAB1
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BRCA2
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MYLIP
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LDLR
CELL MIGRATION
DNA Damage Repair
APOPTOSIS
Therapy Resistance
CELL SURVIVAL
G1/S PROGRESSION
DNA methylation
Glycolysis
G2/M ARREST
Histone methylation
Lipid metabolism
Chromatin remodeling

Dashboard | Clinical Data | Timelines | PCA | PLSR | GBM Pathways | Angiogenesis | Markers & Patients | Distributions | Survival

Credits

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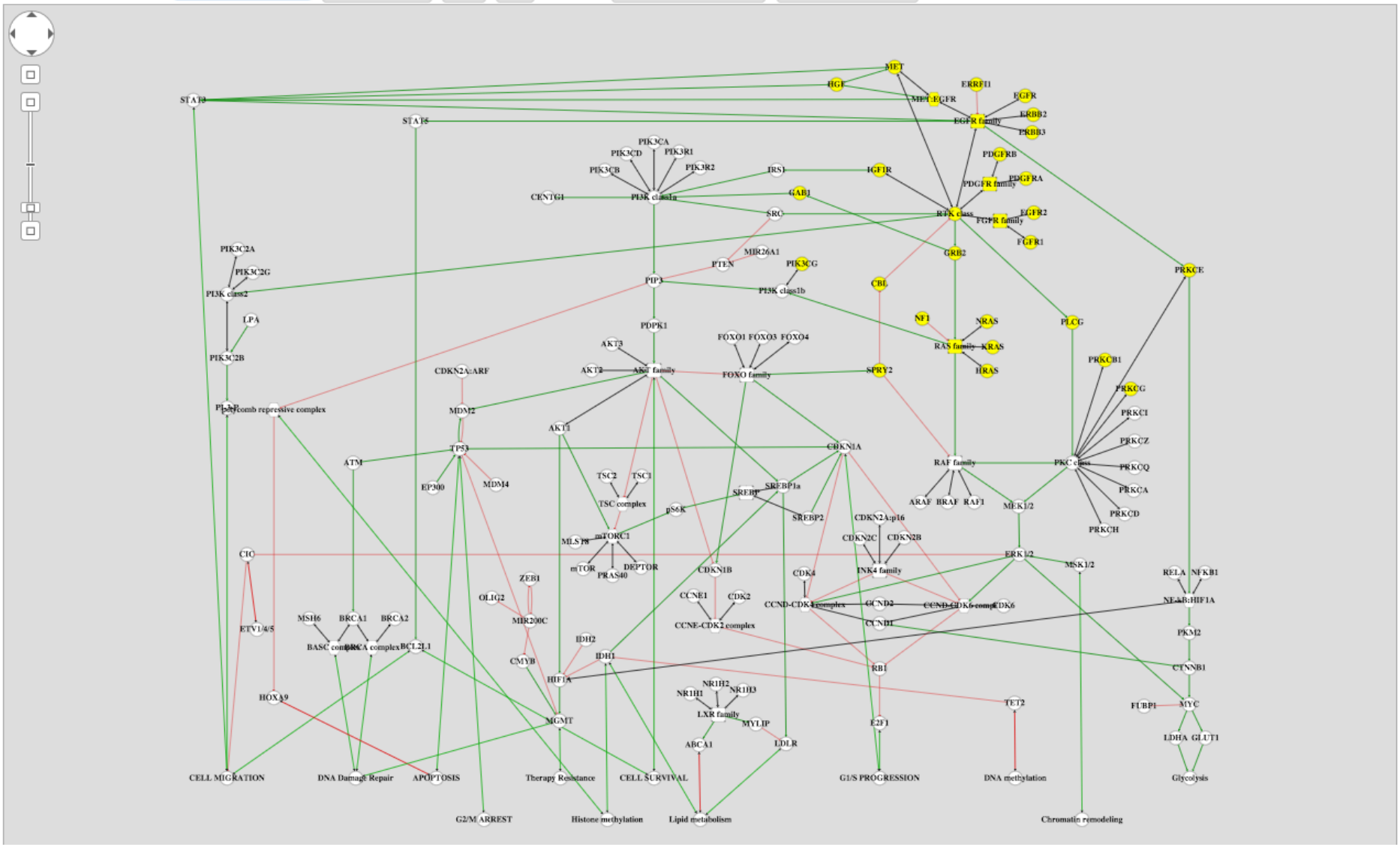

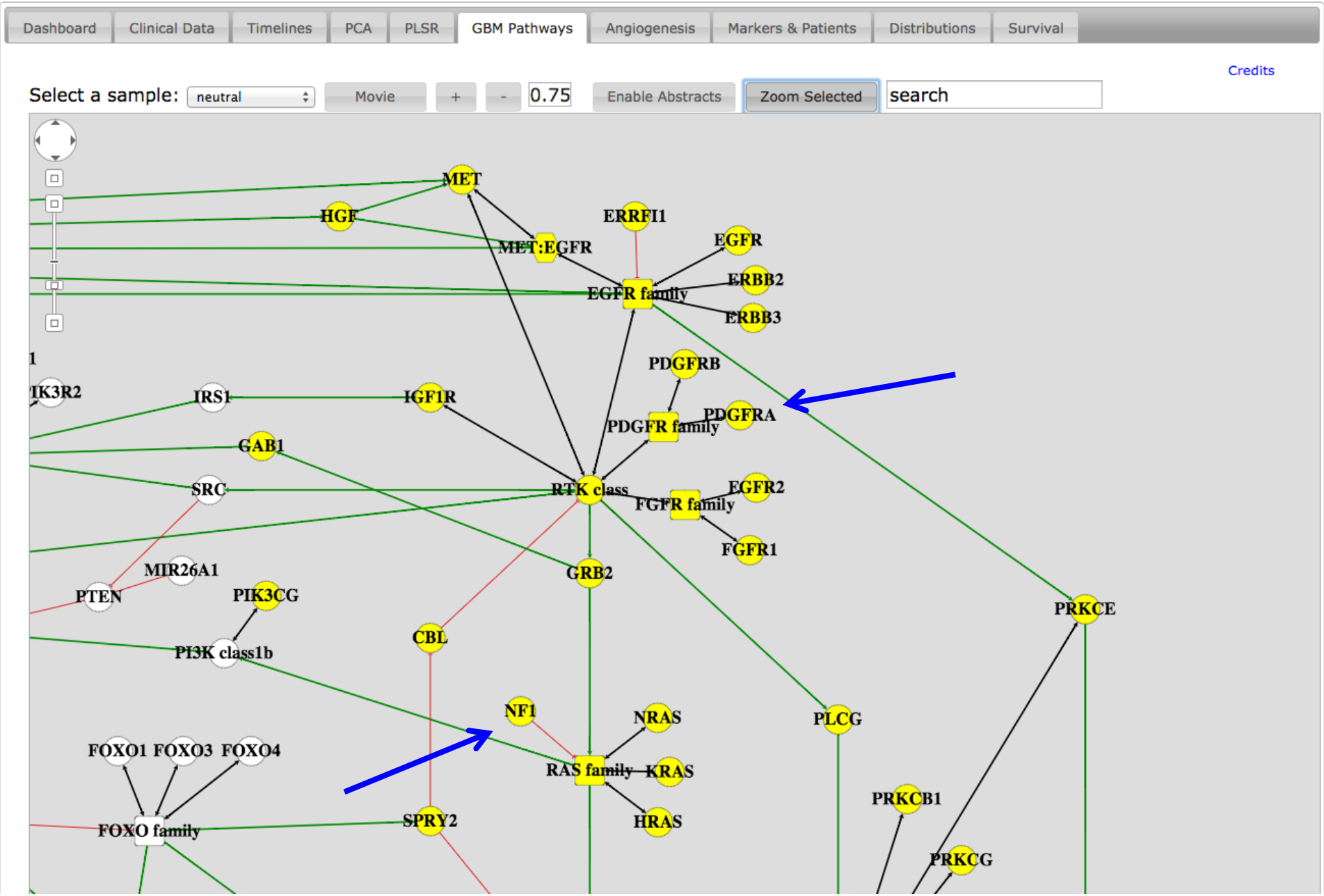
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
Select a sample:
neutral
Movie
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Enable Abstracts
Zoom Selected
search
MET
HGF
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EGFR family
ERBB3
PDGFRB
IRS1
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PDGFR family
PDGFRA
GAB1
SRC
RTK class
EGFR2
FGFR family
FGFR1
GRB2
MIR26A1
PTEN
PIK3CG
PRKCE
CBL
PI3K class1b
NF1
NRAS
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FOXO3
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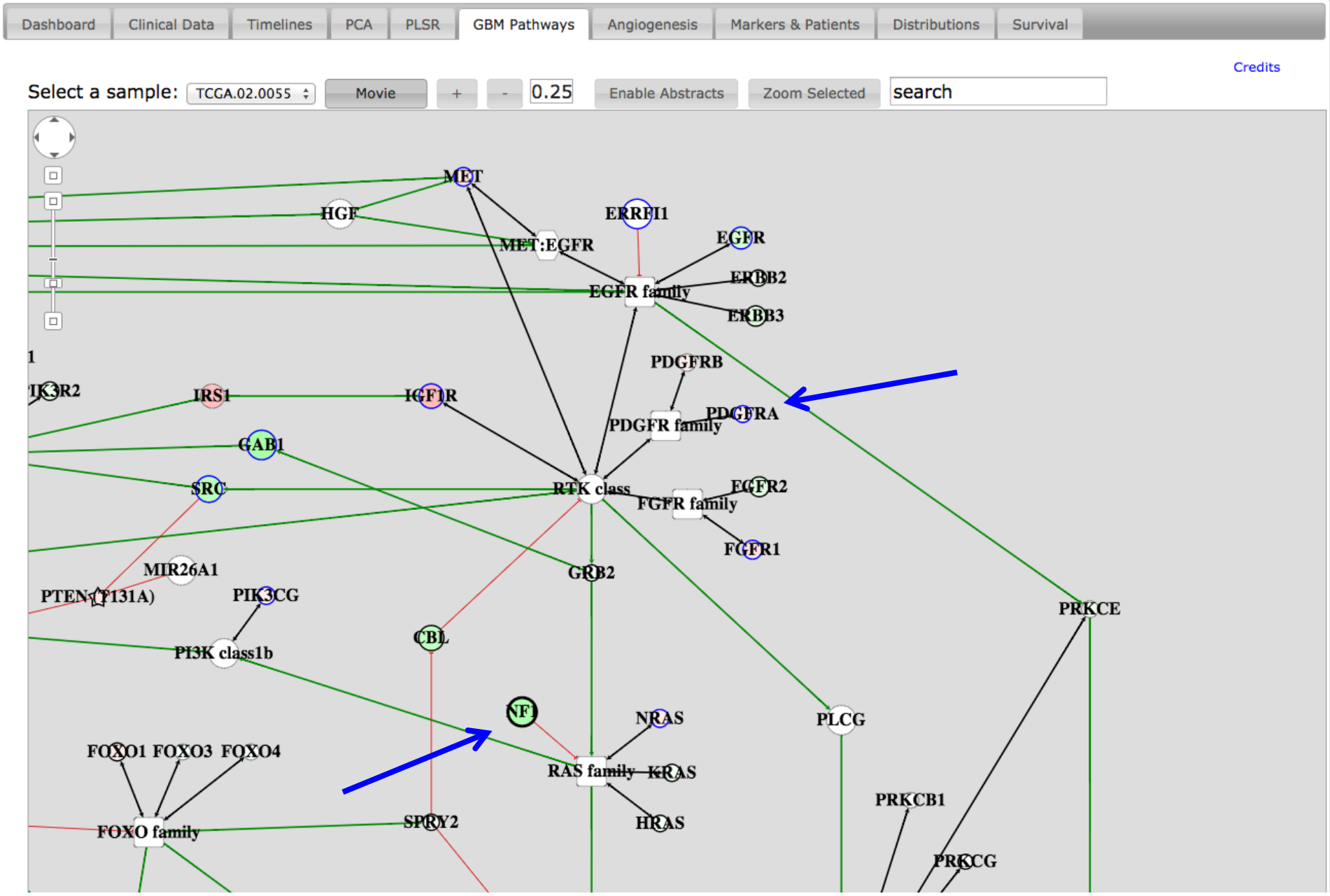
FOXO family
SPRY2
HRAS
PRKCG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Angiogenesis
Markers & Patients
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Survival
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Movie
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Zoom Selected
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MET
HGF
ERRFI1
MET:EGFR
EGFR
ERBB2
EGFR family
ERBB3
PDGFRB
IRS1
IGF1R
PDGFRA
PDGFR family
GAB1
SRC
RTK class
EGFR2
FGFR family
FGFR1
MIR26A1
GRB2
PTEN(P131A)
PIK3CG
PRKCE
CBL
PI3K class1b
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FOXO family
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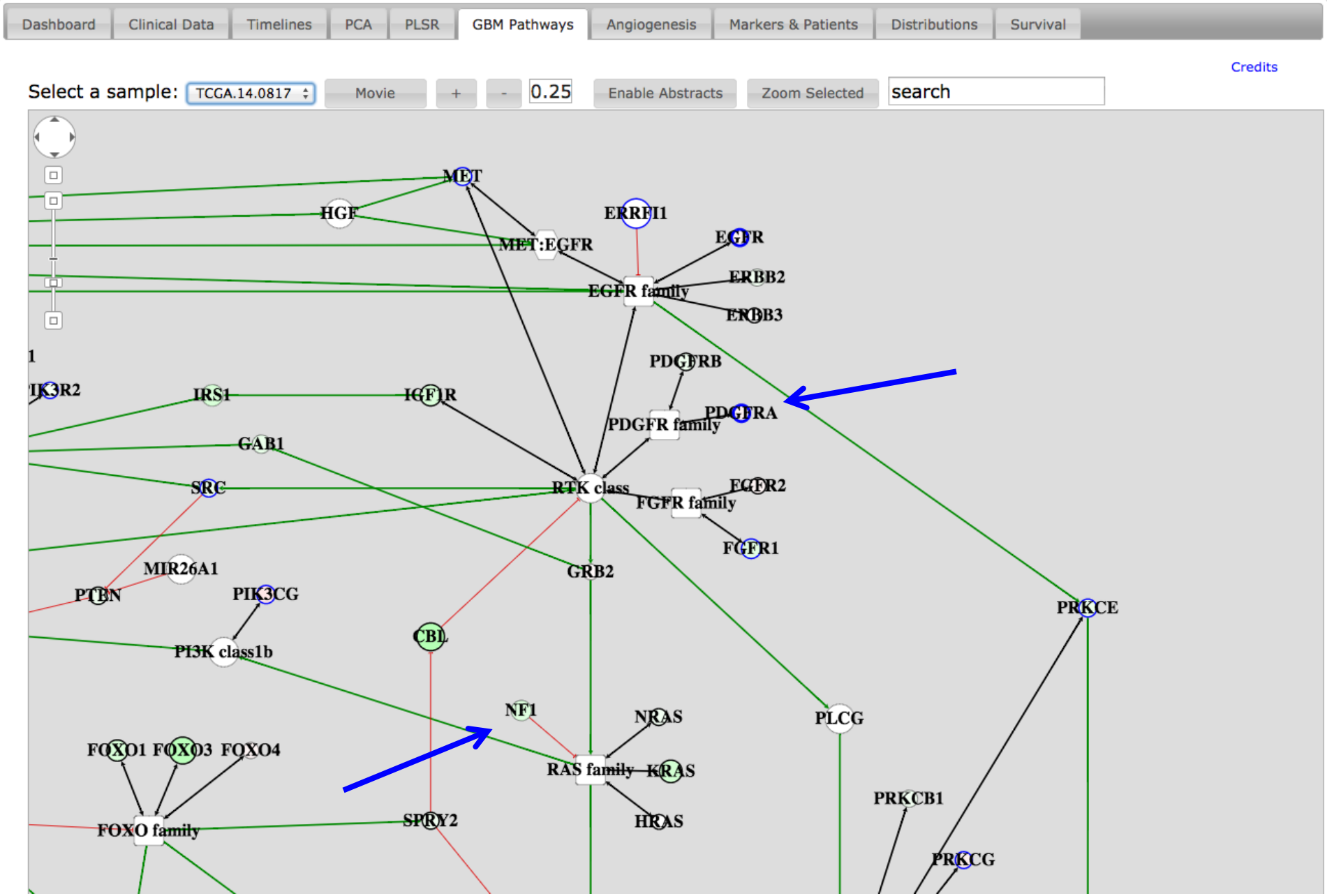
HRAS
PRKCG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IGF1R
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PDGFR family
GAB1
SRC
RTK class
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GRB2
PTEN
PIK3CG
PRKCE
CBL
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NF1
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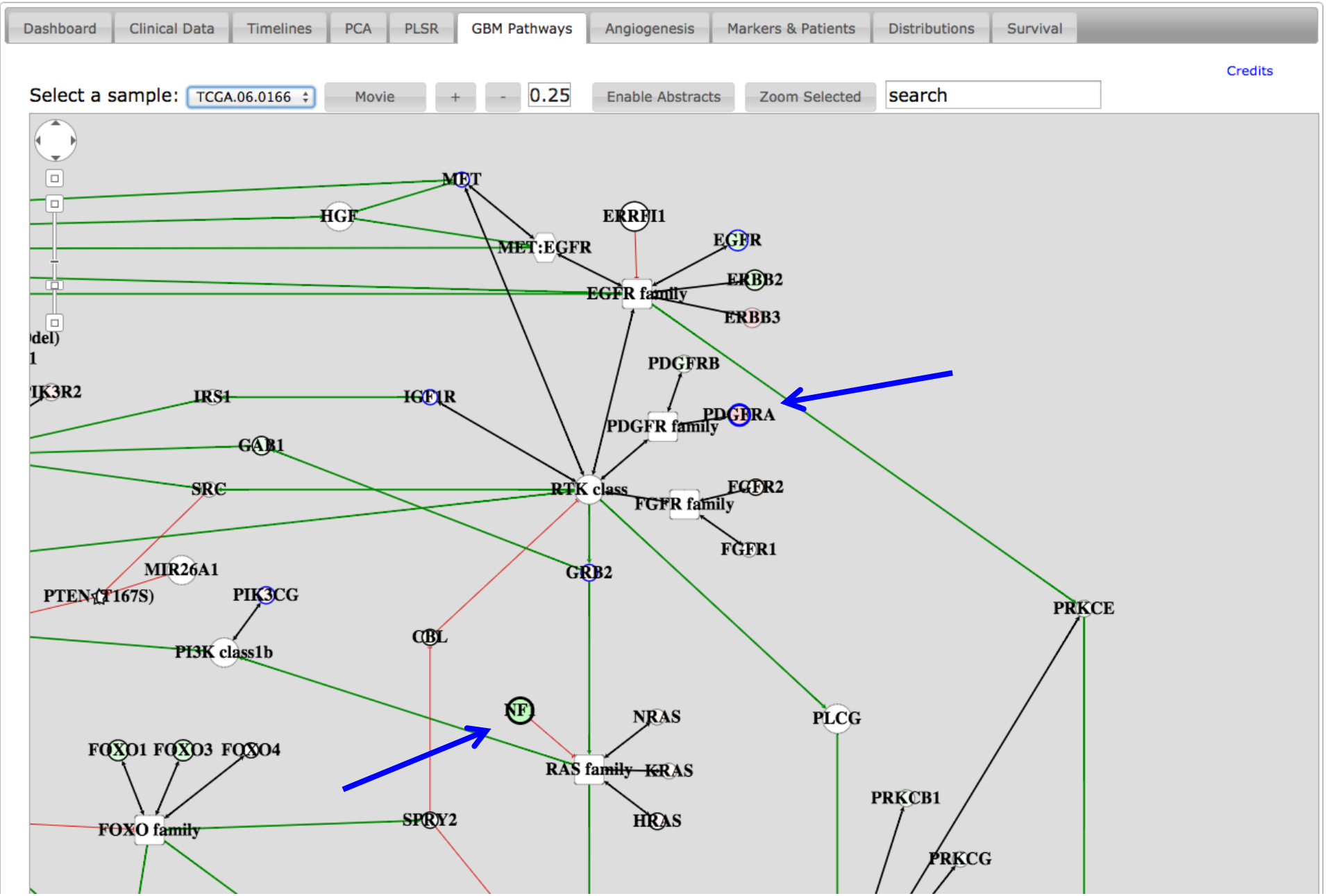
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EGFR
ERBB2
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PDGFRB
IRS1
IGF1R
PDGFRA
PDGFR family
GAB1
SRC
RTK class
EGFR2
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FGFR1
MIR26A1
GRB2
PTEN(T167S)
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PI3K class1b
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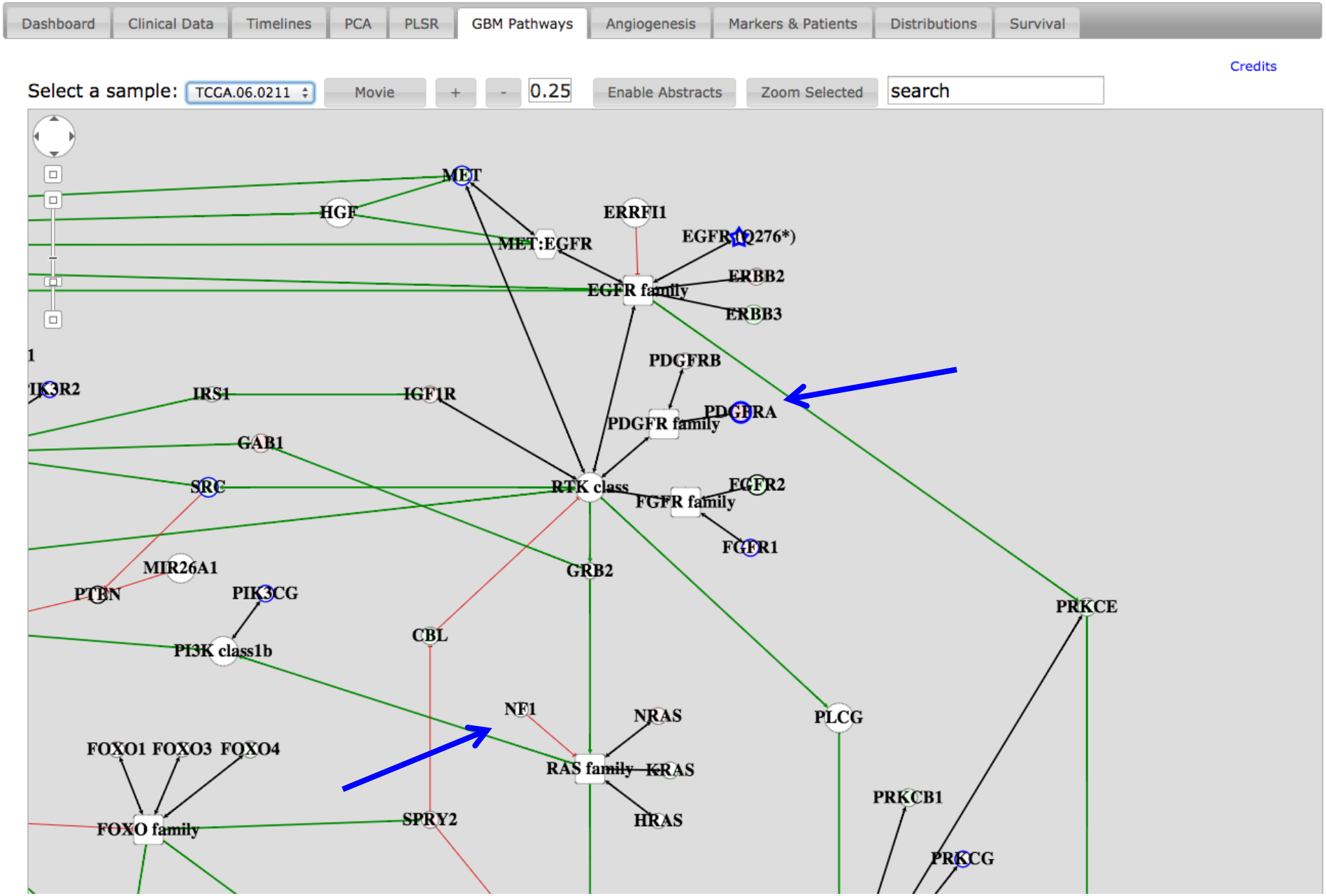
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Markers & Patients
Distributions
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MET:EGFR
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PDGFRB
IRS1
IGF1R
PDGFRA
PDGFR family
GAB1
SRC
RTK class
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FGFR family
FGFR1
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GRB2
PTPN
PIK3CG
PRKCE
CBL
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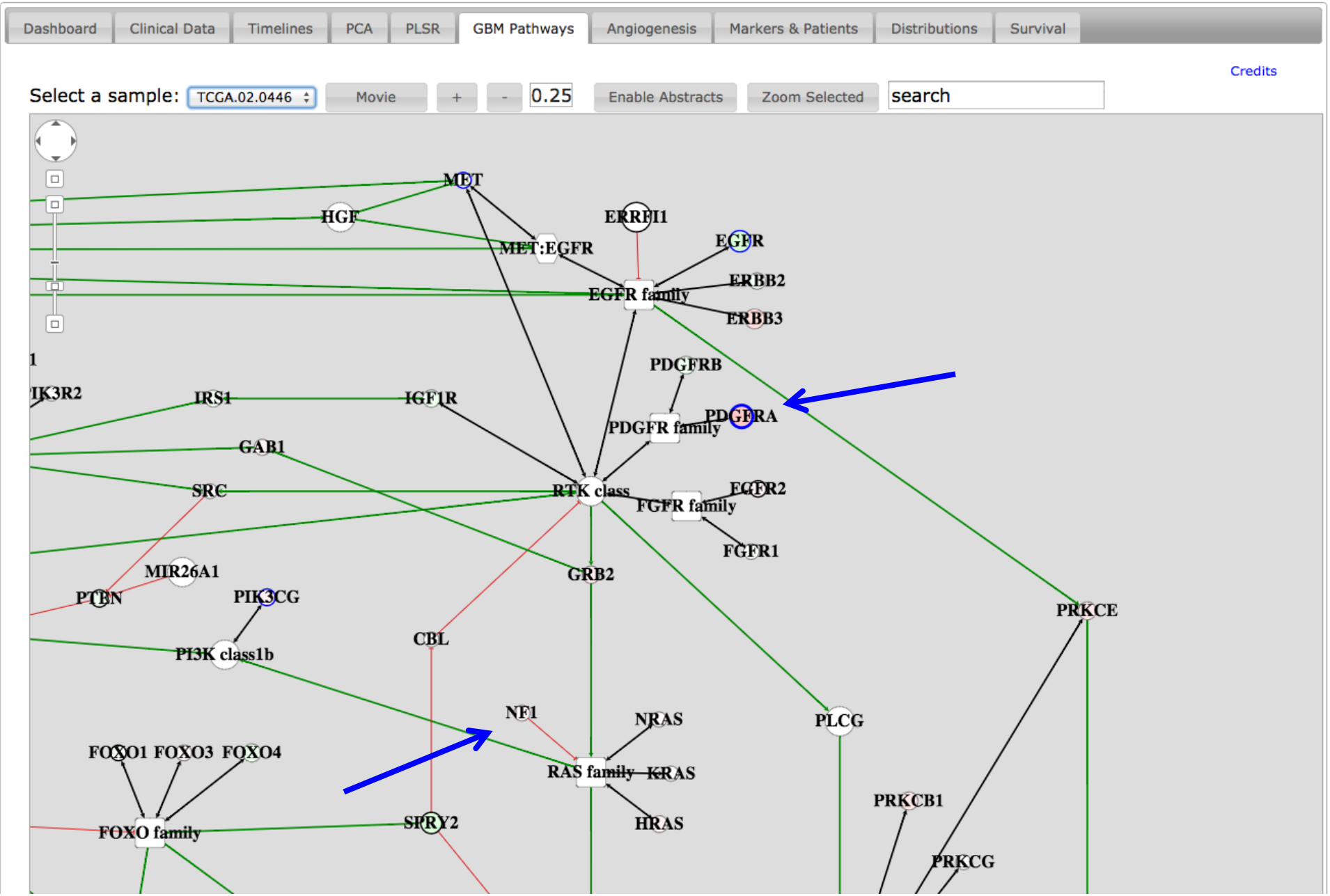
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Markers & Patients
Distributions
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PDGFRA
PDGFR family
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RTK class
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FGFR1
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GRB2
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PI3K class1b
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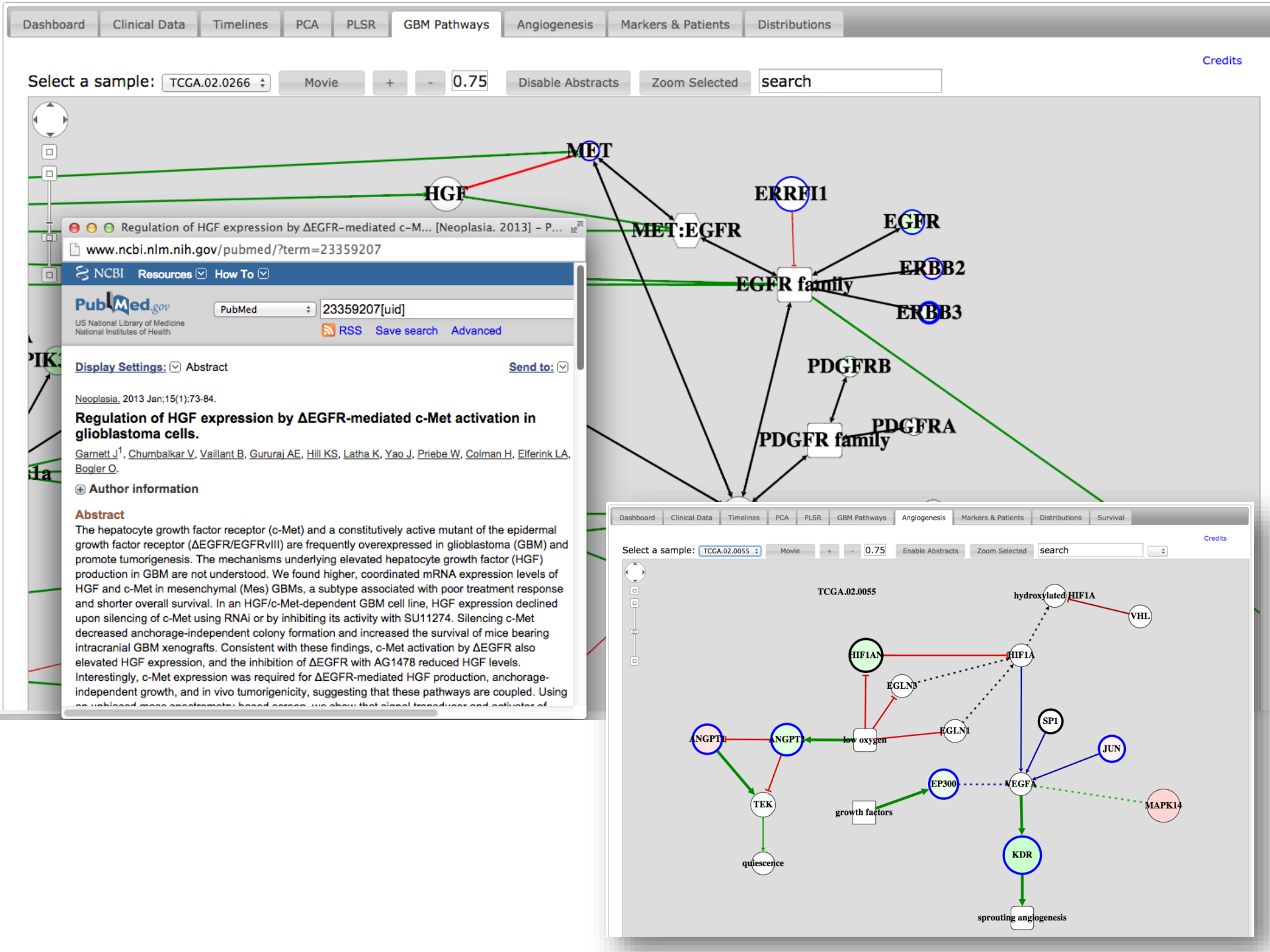
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EGFR family
ERBB3
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PDGFRA
PDGFR family
Regulation of HGF expression by ΔEGFR-mediated c-M... [Neoplasia. 2013] – P...
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NCBI
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How To
PubMed.gov
US National Library of Medicine
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Neoplasia. 2013 Jan;15(1):73-84.
Regulation of HGF expression by ΔEGFR-mediated c-Met activation in glioblastoma cells.
Garnett J[1], Chumbalkar V, Vaillant B, Gururaj AE, Hill KS, Latha K, Yao J, Priebe W, Colman H, Elferink LA, Bogler O.
Author information
Abstract
The hepatocyte growth factor receptor (c-Met) and a constitutively active mutant of the epidermal growth factor receptor (ΔEGFR/EGFRvIII) are frequently overexpressed in glioblastoma (GBM) and promote tumorigenesis. The mechanisms underlying elevated hepatocyte growth factor (HGF) production in GBM are not understood. We found higher, coordinated mRNA expression levels of HGF and c-Met in mesenchymal (Mes) GBMs, a subtype associated with poor treatment response and shorter overall survival. In an HGF/c-Met-dependent GBM cell line, HGF expression declined upon silencing of c-Met using RNAi or by inhibiting its activity with SU11274. Silencing c-Met decreased anchorage-independent colony formation and increased the survival of mice bearing intracranial GBM xenografts. Consistent with these findings, c-Met activation by ΔEGFR also elevated HGF expression, and the inhibition of ΔEGFR with AG1478 reduced HGF levels. Interestingly, c-Met expression was required for ΔEGFR-mediated HGF production, anchorage-independent growth, and in vivo tumorigenicity, suggesting that these pathways are coupled. Using
Dashboard
Clinical Data
Timelines
PCA
PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Survival
Credits
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Enable Abstracts
Zoom Selected
search
TCGA.02.0055
hydroxylated HIF1A
VHL
HIF1AN
HIF1A
EGLN3
SP1
EGLN1
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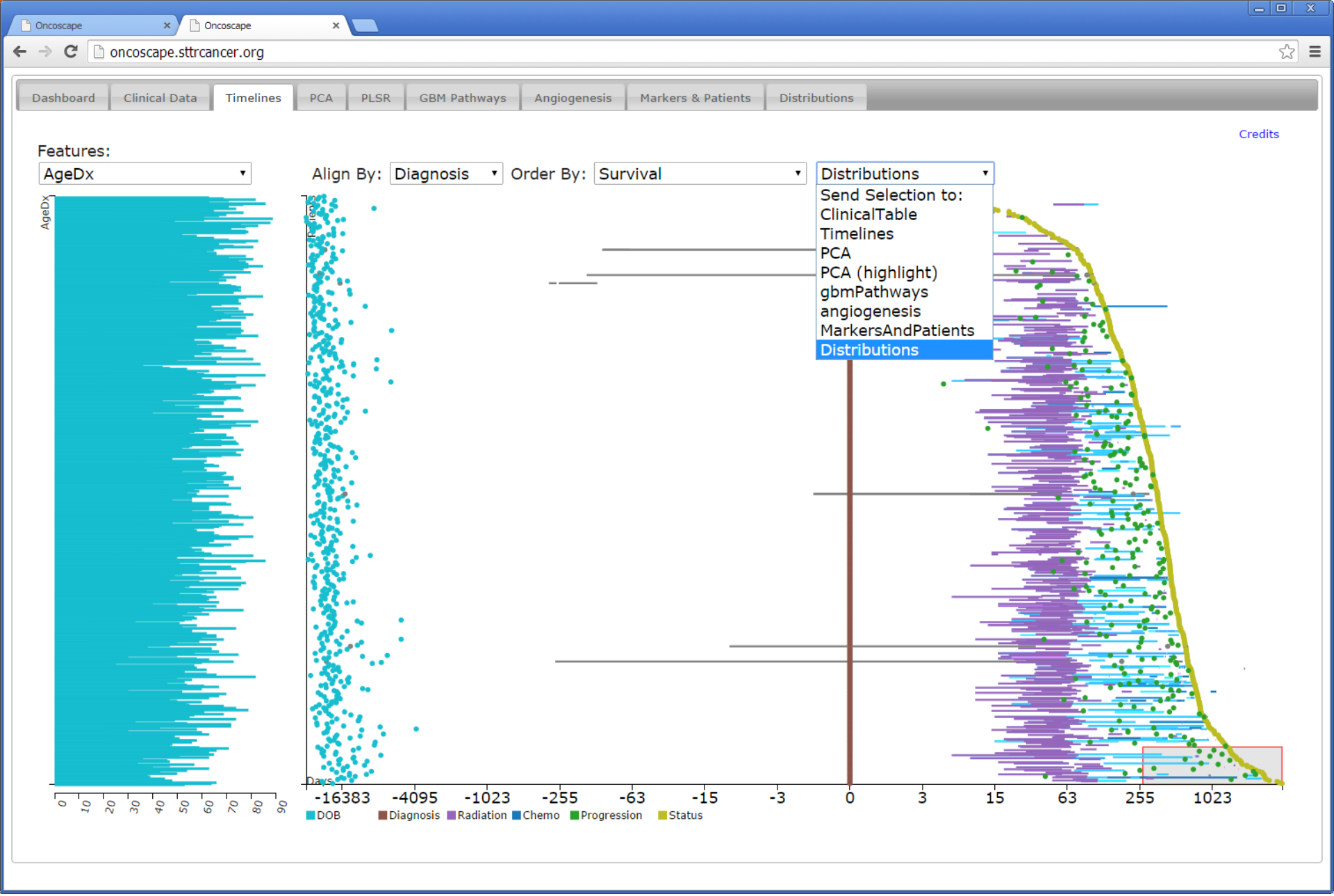
ANGPT2
low oxygen
JUN
EP300
VEGFA
TEK
growth factors
MAPK14
quiescence
KDR
sprouting angiogenesis


Oncoscape
Oncoscape
oncoscape.sttrcancer.org
Dashboard
Clinical Data
Timelines
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PLSR
GBM Pathways
Angiogenesis
Markers & Patients
Distributions
Credits
Features:
AgeDx
Align By:
Diagnosis
Order By:
Survival
Distributions
Send Selection to:
ClinicalTable
Timelines
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PCA (highlight)
gbmPathways
angiogenesis
MarkersAndPatients
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255
1023
DOB
Diagnosis
Radiation
Chemo
Progression
Status

Oncoscape | Oncoscape

oncoscape.sttrcancer.org

Dashboard | Clinical Data | Timelines | PCA | PLSR | GBM Pathways | Angiogenesis | Markers & Patients | Distributions

About Tooltips

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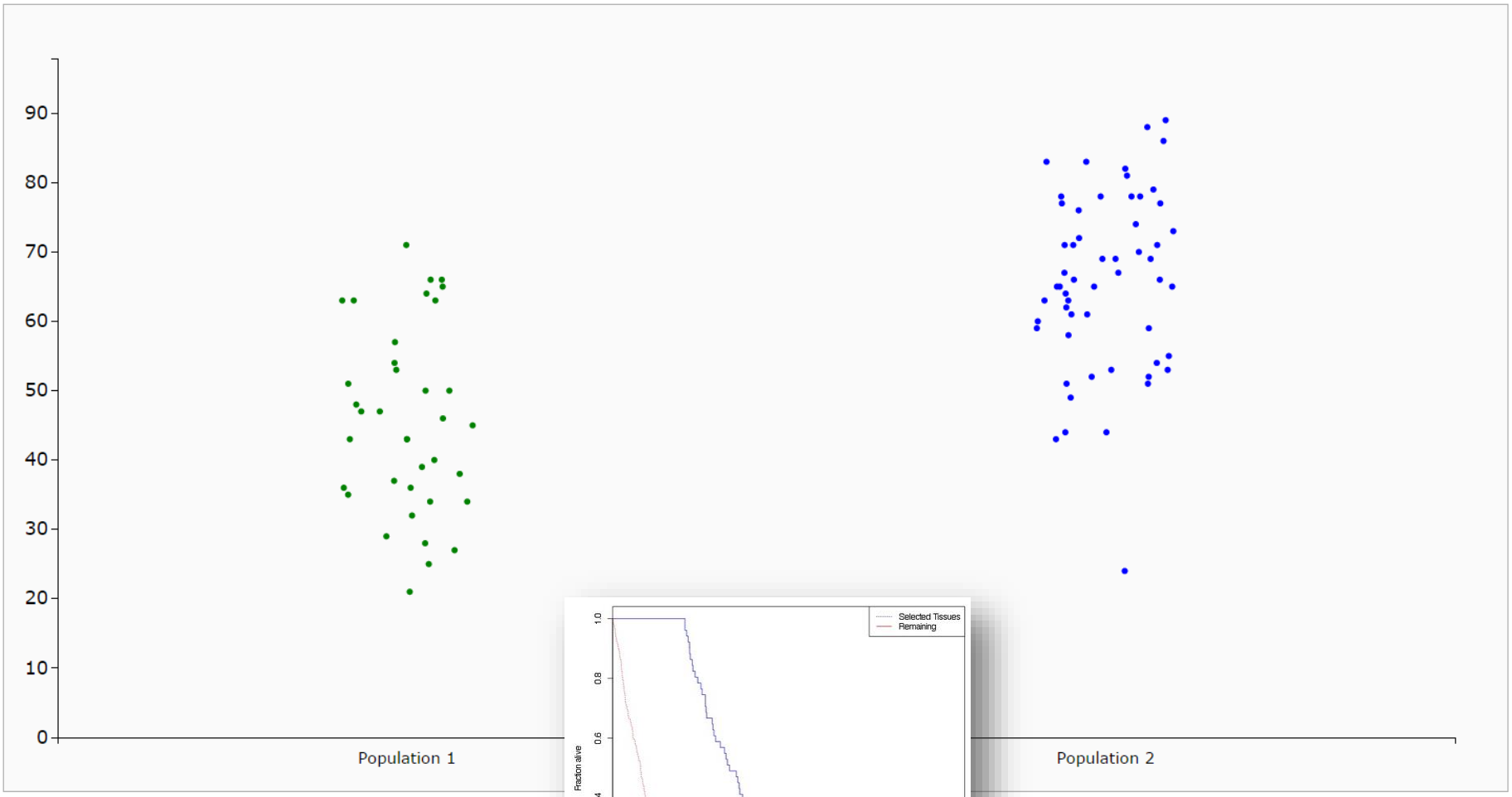
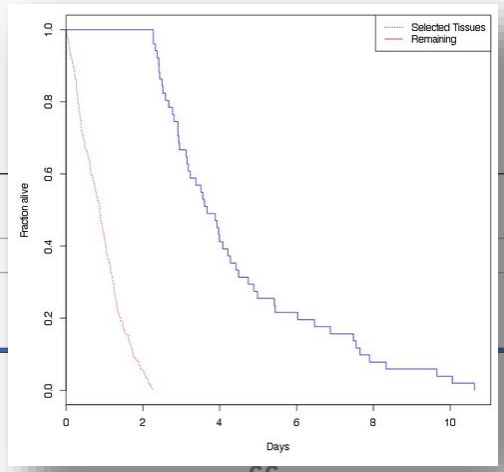
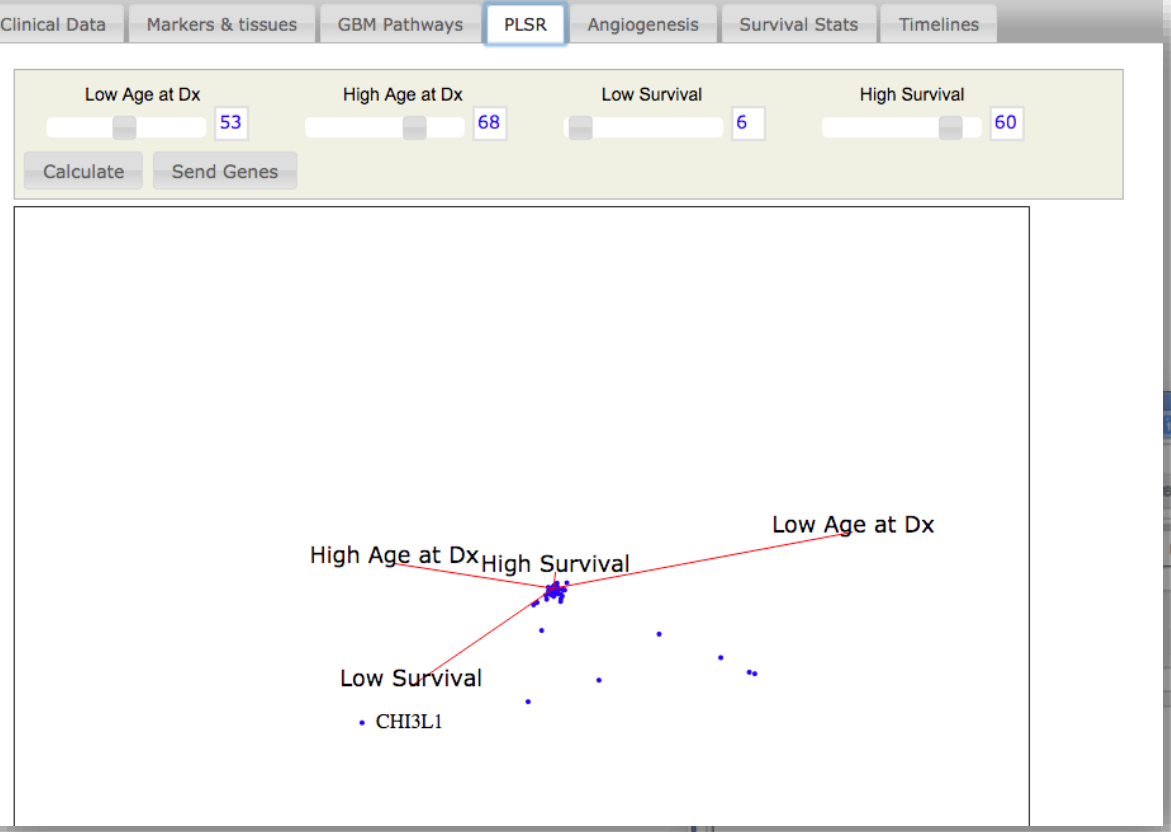


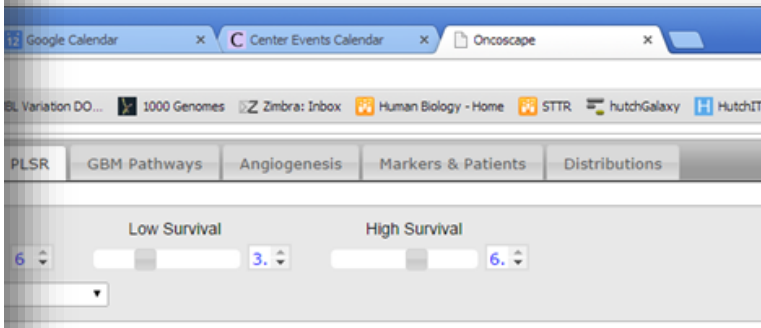


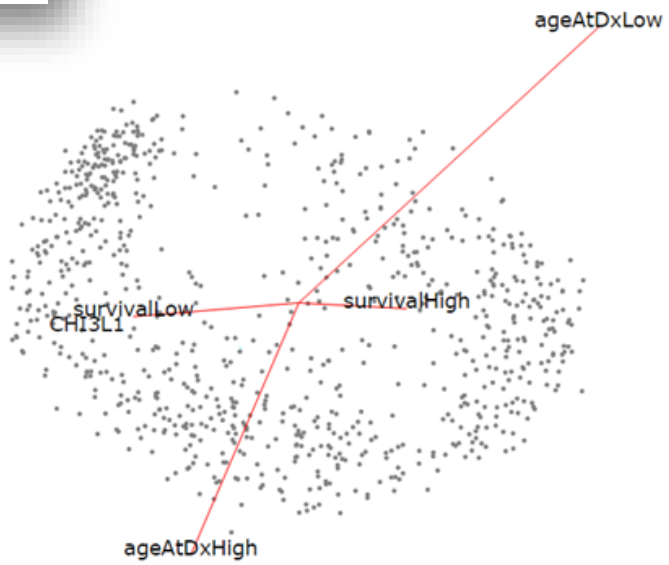
Created by Cliff Rostomily; Last Modified:



Oncoscape using
MSKCC Nanostring data (137 genes)

Oncoscape using
TCGA 'unified' microarray data
(840 subtype classifier genes)





CHI3L1: A glycoprotein involved in inflammation & tissue remodeling marks low survival in 2 datasets.

Gene symbol	Gene name	(Cox PH score)	Low risk			High risk		
			Median	Mean	SD*	Median	Mean	SD*
AGT	angiotensinogen	0.03190	−0.801	−2.335	4.366	0.1767	−0.290	2.319
EGFR	epidermal growth factor receptor	−0.05152	1.106	1.261	3.409	2.850	3.105	2.947
CHI3L1	chitinase 3−like 1	0.00442	3.600	3.782	2.965	6.934	6.168	2.624

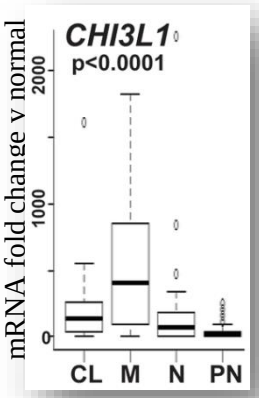
Table 2. Genes differentially expressed between MSKCC and TCGA long-term survivors versus TCGA patients with survival less than 1 year

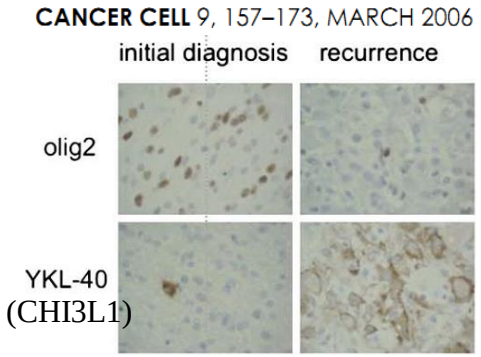
Gene Symbol	*P* value	Percent Change	Increase or Decrease in LTS vs. patients with survival <1 year	Description
EFEMP2*	0.000091	31.31	Decrease	EGF containing fibulin-like extracellular matrix protein 2
CHI3L1*	0.004373	44.95	Decrease	chitinase 3-like 1 (cartilage glycoprotein-39)

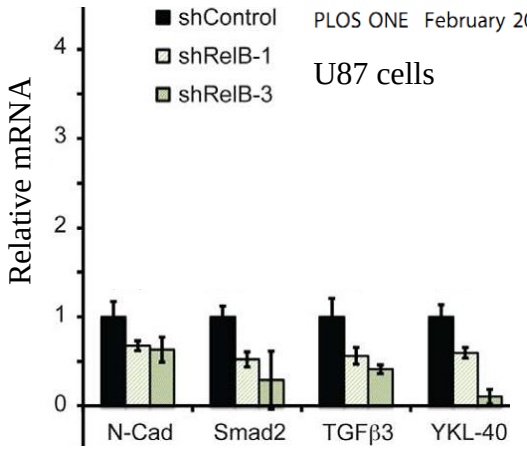
*also significant in REMBRANDT data set.

Neuro-Oncology 16(9), 1186–1195, 2014

Nucleic Acids Research, 2014, 1–11

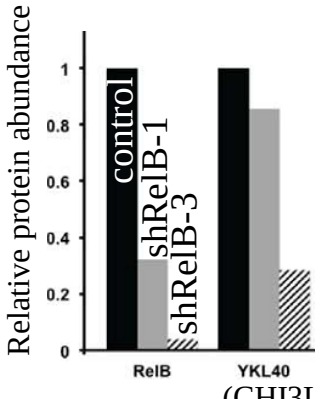






PLOS ONE February 2013 | Volume 8 | Issue 2 | e57489

U87 cells



HIDRA

- Vision and Strategy
- Systems & Requirements
- Program Overview
- Argos user interface
- **Next steps**

HIDRA 2015

- Multiple disease portals
- NLP pipeline implementation
- Integrate data visualization features from Oncoscape
- Technical and operational rollout of use of PHI and data export

Acknowledgements

- LabKey Software
- UW Medicine ITS and Amalga Team
- SCCA Knowledge Management
- CIT Informatics
- NW BioTrust
- Solid Tumor Translational Research